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No. 18

## THIRTY-ONE STEEL VESSELS

NOW UNDER ORDER WITH LAKE BUILDERS FOR DELIVERY IN 1902—COST \$7,763,000—CAPACITY OF FREIGHTERS 136,400 GROSS TONS PER TRIP.

Thirty-one steel vessels, now under order with the ship builders of the great lakes for delivery between the opening of navigation and July 1 of next year, will be built at an aggregate cost of \$7,763,000. This does not include four large steamers for salt-water service—two at the Craig works of Toledo and two at the Cleveland yard of the American Ship Building Co.—which have been under construction for several months past and which are regarded as this year's ships. Of the thirty-one vessels in the 1902 fleet, all but four (three passenger steamers and a lighthouse tender) are freighters, and their combined capacity for a single trip on 18 ft. draught is 136,400 gross tons, so that for a full season of fair despatch a conservative estimate of season capacity is 3,000,000 gross tons, as there is only one tow barge in the list and all of them, with the exception of a lumber carrier to be built at the Craig works for Swain & Hoyt of San Francisco, are intended for lake service. Twenty-seven of the vessels are to be built at the several works of the American Ship Building Co. The present season of ship building is already the heaviest in the history of the lakes but orders are not all placed as yet. Negotiations still under

## CONCENTRATING STEEL CORPORATION PROPERTIES.

President Charles M. Schwab, accompanied by a number of the officials of the United States Steel Corporation, is at present making a tour of inspection of the western plants of the great corporation. It is understood that one of the objects of the trip is the ultimate concentration of a number of the plants. A plan is now being considered to merge the American Tin Plate Co. and the American Sheet Steel Co. into one company. The National Steel Co. and the American Steel Hoop Co. have already been merged into the Carnegie Co.

During the past few days there have been several stories set afloat regarding the proposed organization of a rival to the United States Steel Corporation, the moving factors being given as the Moore Bros. and Henry C. Frick. The Moores are said to be disgruntled over their failure to have the Steel Corporation take over the plants of the American Can Co. at their own valuation and that they, therefore, desire to establish an independent tin plate plant. No reason is assigned for Mr. Frick's ambition to head a rival steel organization and it is more than likely that there is no base to the rumors. Indeed they will not bear analysis. The American Can Co. consumes about 65 per cent. of the product of the American Tin Plate Co. and is known to be on friendly terms with the Steel Corporation. Moreover it would be impossible to organize another corporation as great as the United States Steel Corporation, for the simple

### Particulars of thirty-one Steel Vessels under construction in Great Lakes Ship Yards, for delivery in 1902.

#### SHIPS BUILDING AT THE SEVERAL WORKS OF THE AMERICAN SHIP BUILDING CO.

To be built in	Type.	Dimensions in feet.				Dimensions of engines. All triple expansion.	Boilers—dimensions in ft. and in.	Draft.	Steam pressure, lbs.	Capacity, gross tons, 18 ft. draught.	Value.	For whom building.
		Over all.	Keel.	Beam.	Depth.							
Cleveland	Cargo stmr.	436	416	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	6,200	\$260,000	John Mitchell, et. al., Cleveland.
Cleveland	Cargo stmr.	436	416	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	6,200	260,000	John Mitchell, et. al., Cleveland.
Lorain	Cargo stmr.	400	380	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Howden	170	5,600	240,000	J. C. Gilchrist, Cleveland.
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Lorain	Cargo stmr.	400	380	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Howden	170	5,600	240,000	J. C. Gilchrist, Cleveland.
Buffalo	Cargo stmr.	400	380	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Howden	170	5,600	240,000	J. C. Gilchrist, Cleveland.
Bay City	Cargo stmr.	434	414	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	6,200	260,000	W. W. Brown syndicate, Cleveland.
Chicago	Cargo stmr.	390	370	48	28	20, 33½, 55x40	Two Scotch, 12-10x13	Natural	170	5,250	230,000	W. W. Brown syndicate, Cleveland.
Chicago	Cargo stmr.	366	346	48	28	20, 33½, 55x40	Two Scotch, 12-10x13	Natural	170	4,800	220,000	W. W. Brown syndicate, Cleveland.
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Chicago	Cargo stmr.	366	346	48	28	20, 33½, 55x40	Two Scotch, 12-10x13	Natural	170	4,800	220,000	W. W. Brown, et. al., Cleveland.
Cleveland	Cargo stmr.	374	354	48	28	20, 33½, 55x40	Two Scotch, 14x12	Natural	170	4,900	220,000	W. C. Richardson, Cleveland.
Superior	Cargo stmr.	366	346	48	28	20, 33½, 55x40	Two Scotch, 12-10x13	Natural	170	4,800	220,000	G. A. Tomlinson, Duluth.
Superior	Cargo stmr.	366	346	48	28	20, 33½, 55x40	Two Scotch, 12-10x13	Natural	170	4,800	220,000	G. A. Tomlinson, Duluth.
Detroit	Cargo stmr.	366	346	48	28	22, 35, 58x42	Two Scotch, 13-2x11-6	Howden	170	4,800	230,000	Franklin Transportation Co., Cleve'd.
Buffalo	Barge	350	366	44	26	.....	.....	.....	.....	5,350	185,000	Franklin Transportation Co., Cleve'd.
Chicago	Package frt.	345	325	44	28	23, 38, 64x40	Three Scotch, 12x11-6	Howden	180	4,100	280,000	Western Transit Co., Buffalo.
Superior	Cargo stmr.	366	346	48	28	20, 33½, 55x40	Two Scotch, 12-10x13	Natural	170	4,800	220,000	F. Seither, Cleveland.
Lorain	Cargo stmr.	434	414	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Ellis & Eaves	170	6,200	260,000	Arthur Hawgood and others, Cleve'd.
Bay City	Cargo stmr.	434	414	50	28	22, 35, 58x42	Two Scotch, 13-2x11-6	Ellis & Eaves	170	6,200	260,000	H. A. Hawgood and others, Cleve'd.
Bay City	Cargo stmr.	434	414	50	28	22, 35, 58x42	Two Scotch, 13-2x11-6	Ellis & Eaves	170	6,200	260,000	W. A. Hawgood and others, Cleve'd.
Lorain	Cargo stmr.	400	380	50	28	22, 35, 58x40	Two Scotch, 13-2x11-6	Howden	170	5,600	260,000	W. A. Hawgood and others, Cleve'd.
Detroit	Day pass. stmr.	308	300	37½	13-6	33, 51, 82x72	Five of cylindrical type	.....	170	.....	275,000	White Star Line, Detroit.
Detroit	Pass. and frt. stmr.	366	350	55	19-6	.....	Eight Scotch	.....	.....	.....	640,000	Detroit & Buffalo Steamship Co.
Detroit	Pass. and frt. stmr.	366	350	55	19-6	.....	Eight Scotch	.....	.....	.....	640,000	Detroit & Buffalo Steamship Co.

#### BUILDING AT WORKS OF CRAIG SHIP BUILDING CO., TOLEDO, O.

Toledo	Cargo stmr.	220	204	40	16	15, 25, 42x36	Two Scotch, 11x10	Natural	175	2,000	\$110,000	Chas. Beatty of Buffalo, and others.
Toledo	Cargo stmr.	200	184	38	16	15, 25, 42x36	Two Scotch, 11x10	Natural	180	1,800	110,000	Swain & Hoyt, San Francisco, Cal.

#### BUILDING AT WORKS OF JENKS SHIP BUILDING CO., PORT HURON, MICH.

Port Huron	Cargo stmr.	257	243	43	26½	17½, 28, 47x40	Two Scotch, 12x11-6	Natural	180	3,000	\$150,000	Jenks Ship Building Co., Port Huron.
Port Huron	Light-house tender	160½	151	28	14	22 and 42x36	Two Cylinder, 11½x11	Natural	180	.....	108,000	United States lighthouse service.
										136,400	\$7,763,000	

way may result in three or four contracts being closed within the next few weeks. The lighthouse tender referred to above is to be built at the works of the Jenks Ship Building Co., Port Huron, Mich., and that company is also to build a steam freighter of Canadian canal dimensions, which will be suited to salt water service if it is found advisable to send her to the seaboard. No wooden vessels are planned as yet but the construction of a few of these may be undertaken before the winter sets in.

Ship building orders announced during the past week include two steel steamers and a tow barge. One of the steamers is for W. A. Hawgood and others of Cleveland and is of 5,600 gross tons capacity. The other steamer and the tow barge are for the Franklin Transportation Co., in which Mr. D. R. Hanna of M. A. Hanna & Co., Cleveland, is the moving spirit. Particulars of these vessels will be found with others in the general list.

Mr. J. E. Botsford and others of Port Huron, Mich., who contemplate the establishment of a yard at St. Clair or Marine City, Mich., for the building of steel vessels, are said to be planning upon the construction of eight steamers for the service of their Port Huron & Duluth Steamship Co. in connection with the Grand Trunk railway. It is said that the Grand Trunk has completed details of a scheme that will give that road a continuous chain of connections for the shipment of grain from Duluth and Port Arthur elevators to Leith, Scotland, where a new elevator has just been finished. It is also said that the service of two elevators at Port Huron will be increased by the construction of a new house at that point.

A strong situation in iron and steel has been strengthened during the past week. Lower prices may come next year but reductions are not likely to find any place in the program of the iron trade for some months to come. Leading steel rail mills are filled to October next and foreign orders are being lost because of inability to make deliveries. There is now booked for next year about 1,600,000 tons. The pig iron market is again firmer.—Iron Trade Review.

reason that it could not obtain ore sufficient to meet the requirements of its mills. There is doubtless ore sufficient in existence but it is not so situated that it can be assembled as cheaply as the ore of the Steel Corporation. The Steel Corporation will always have competition but it will be from small organizations which are favored by some special circumstance, such as the ownership of a peculiar variety of ore or proximity to a certain market or skill in the manufacture of a highly specialized product. It is not within reasonable calculation that the Steel Corporation will ever have a rival as formidable as itself. It should be added also that Mr. Frick, who is one of the few men in the country who could lead such an organization, is vitally concerned in the success of the United States Steel Corporation. He is one of its directors and is among its heaviest stockholders.

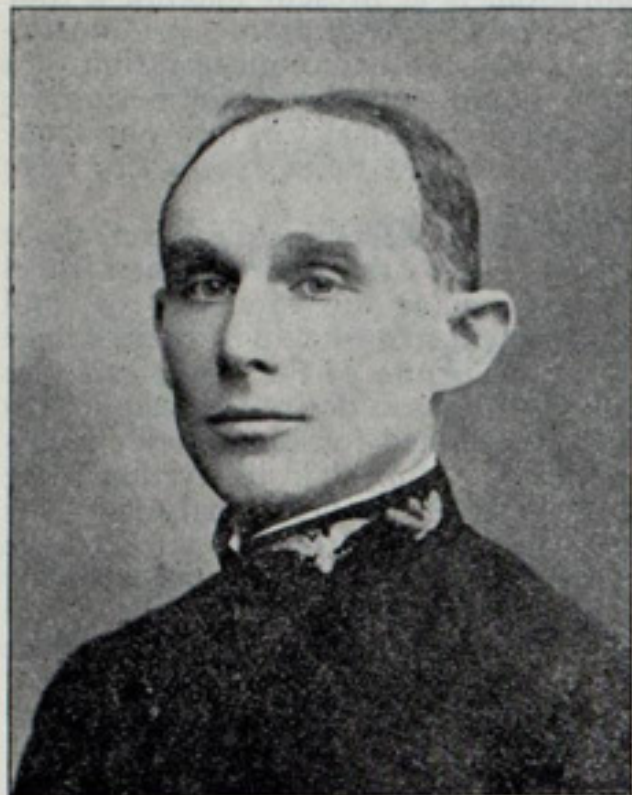
With a demand at Duluth for grain carriers sufficient to advance freights to 3 cents a bushel on wheat to Buffalo and \$1.10 a ton on ore from the head of Lake Superior to Ohio ports, vessel owners of the lakes are assured of very profitable rates in the closing weeks of navigation, but the ore shippers still insist that they will take no part in further advances; that they have very little ore unprovided by contract that must be moved and that many mines will close rather than pay the \$1.10 rate. The future of the market, they say, must depend upon the grain. Coal shippers would be a factor in the competition for ships but the railroads cannot provide equipment for moving the coal to lake shipping ports. A more liberal supply of coal within the next few weeks may still further increase the demand for ships, but it would still seem that there is to be, in any event, a very large shortage of coal at all upper lake ports when navigation closes. The best feature of the present situation from the vessel standpoint is the fact that the season will close on a high rate basis, which will mean less freight moved than was intended. If it were otherwise the outlook for another season would be discouraging, in view of the large amount of new capacity to come from the ship yards.



## TRAINING SERVICE IN SAILING SHIPS.

REAR ADMIRAL BOWLES RECOMMENDS THE CONSTRUCTION OF SIX OF THEM—CORPS OF NAVAL CONSTRUCTORS SHOULD BE INCREASED.

A brief summary was given in the last issue of the Review of the annual report of Rear Admiral F. T. Bowles, chief constructor of the navy. The completed report is now at hand. The sum of \$9,000,000 is asked for the construction and repair of vessels already existing or on the stocks. The sum of \$17,303,010 is asked for new construction—that is for vessels



REAR ADMIRAL F. T. BOWLES.

already authorized by congress, but upon which work has scarcely yet begun. Progress upon new vessels under construction has been delayed during the past fiscal year by strikes and by delays in the delivery of armor and steel forgings so that all ships and torpedo boats under construction are more or less behind their contract time of completion. The progress of construction is each month given in the Review so that the report contains nothing new upon that subject. The chief constructor notes that he has specifically called the department's attention to the probability of two years' delay in the completion of the five battleships of the Virginia class and the six armored cruisers of the Pennsylvania class, whose construction has just begun, from the fact that the capacity of the manufacturers of armor is insufficient to provide the amount of armor required for these vessels within the period of time allotted for their construction in the terms of the contracts. Under the present system of purchase of armor the responsibility for such delays rests with the government and renders it liable to suits for damages by the ship contractors. On this account and because it is uneconomical and poor policy to unduly extend the time of construction, it is of importance that the delivery of armor should be adequate to the most prompt work of which the ship builders are capable.

The total quantity of ship steel inspected by the bureau and the amount passed and shipped for incorporation into naval vessels show some decrease from the figures of the preceding year. The total quantity submitted to inspection under the bureau's requirements during the fiscal year ended June 30, 1901, was about 70,600,000 lbs. as compared with a total of about 75,500,000 lbs. for the fiscal year ended June 30, 1900. The great activity in the steel industry and the continued urgent demand for all classes of finished products has at times made it difficult to meet the demands of ship builders having contracts for naval vessels. The production of nickel steel for protective decks and other purposes, combining armor with structural features, has kept pace with preceding years and reached a total of about 5,130,000 lbs. The improvement in surface and in characteristics upon physical and ballistic tests have been fully maintained and little difficulty is being experienced in procuring nickel steel of high characteristics in whatever quantity may be required.

### RECOMMENDS A TRAINING SERVICE IN SAILING SHIPS.

Rear Admiral Bowles makes the following specific recommendations for new vessels:

"After careful consideration of the needs of the training service, the bureau recommends for construction six sailing vessels of about 1,900 tons displacement—two for the Pacific coast and four for the Atlantic coast—to be used in the training of apprentices and landsmen for the naval service. The designs for these vessels, already submitted to the department, are based upon those of the most successful sailing frigates. They will be full-rigged ships, built of steel, with double bottom, enough water-tight subdivision for safety, with sufficient boiler power to distill water and provide for ventilation and flushing of sanitary appliances, and with sufficient room to comfortably carry a crew of 300. The battery will consist of six 4-in. guns and four 6-pounders. The estimated cost is \$350,000 each, complete, except armament. The bureau ventures the opinion that the construction and use of these vessels for the purpose indicated will prove not only the most efficient, but certainly the most economical, method of training boys and men for the seaman branch of the enlisted force. It may be pointed out that the enlisted force consists, essentially, of two main divisions: First, the artificers, who should begin their duties on board ship as trained mechanics, learning by experience on regular vessels such qualities of the sailor as are necessary; second, the seaman branch, who should be, primarily, sailors, learning by experience in the effective fleet such mechanical aptitude as may be necessary in general service. In line with this recommendation, to meet the necessities of the training service at the training stations, the bureau recommends the construction of two small wooden sailing brigs to be used for exercise, one at the training station, Newport, R. I., and one at the training station, San Francisco, Cal., to cost \$50,000 each. The additional naval stations authorized, and the completion of the new dry docks under construction, will require the use of four additional tugs for the service, and the recommendation for their construction is made in order that the tugs may be built and ready for the service at the proper time."

The bureau has of late made considerable progress toward the standardization of ship fittings and has secured toward this desirable end the co-operation of the ship builders, having contracts with the department, who realize that the use of standard fittings will decrease delays in the construction of a vessel and reduce its cost. Upon the subject of fireproof wood the report says: "The bureau having conducted an exhaustive investigation of the qualities of fireproofed wood produced by two different processes, has found that the products of both possess desirable qualities in rendering wood unflammable, yet fail to show all the desiderata of a

fireproof wood, which include the permanent retention of the ingredients under all climatic conditions, freedom from corrosive properties, and unaltered strength and durability. The experience of vessels in commission fitted with fireproofed wood, as well as the tests conducted by the bureau, showed that there was no practical advantage gained by the use of fireproofed deck planking, or by the use of fireproofed wood below protective decks, and also that owing to the absorptive qualities of this wood its use was objectionable in those locations. Hence the department has, upon the recommendation of this bureau, dispensed with the use of fireproofed wood in the navy, except for such necessary joiner work as may be used above protective decks and on torpedo boats."

Rear Admiral Bowles has reversed the policy of his predecessor on the subject of sheathing. He has exercised the discretion authorized by congress and dispensed with the sheathing and coppering of three battleships of the Virginia class and three armored cruisers of the Pennsylvania class. The saving in first cost effected thereby will be about \$1,000,000, and in his opinion, the durability of the vessels will be increased.

The report earnestly urges the establishment of a dry dock in the Philippines at the earliest possible moment for strategical and economical reasons. The number of vessels on the Asiatic station has made it necessary to dock one of them once about every ten or twelve days throughout the year. Outside of the small vessels which can be handled by the marine railway at Canacao the United States ships must be docked in neutral ports—places where no competition is available and where the cost of work is excessive. It is recommended that only such repairs be made on foreign stations as are essential to the maintenance of the fleet and that all extensive overhauling be done in home ports. He recommends that the Havana floating dry dock, recently purchased from the Spanish government, be sent at once to Olongapo, Subig bay, where it can be immediately used to great advantage. It has a lifting capacity of 10,000 tons.

### CORPS OF NAVAL CONSTRUCTORS INADEQUATE.

Attention is called to the necessity for an increase in the number of officers in the corps of naval constructors, which is now limited to forty and is inadequate to present needs. It is recommended that it be increased to sixty. It is also pointed out that the progress in ship building and in the art of naval construction in the United States has been so great in the past decade that it is no longer necessary to send the graduates of the naval academy abroad. Arrangements have instead been made to send three naval cadets each year to the Massachusetts Institute of Technology where a special course of instruction in naval architecture may be received. Upon the subject of additions to the working force, the report says:

"The work devolving upon the bureau's staff in the design of new vessels, the supervision of vessels under construction, and the administration of repair work has taxed it to its utmost capacity under present conditions. These conditions have been aggravated by the lack of space in the navy department building available for the technical and clerical staff of the bureau, and measures have been taken to make the best possible use of the contracted quarters. A systematic reorganization of the drafting force has been made, with a view to increasing its efficiency in the bureau and offices of naval constructors at navy yards and at the works of the ship contractors. The bureau finds a lack of an adequate supply of educated young men suitable for the responsible employment of draftsman, and hopes to attract to this position an increasing number of graduates of technical schools, many of whom have, within recent years, reached positions of responsibility in the ship building industry. The bureau places great importance upon an efficient corps of carpenters in the navy as a valuable adjunct to the corps of naval constructors and as a necessary part of the organization for the maintenance of the fleet in service, and takes great interest in securing for this corps an adequate number of intelligent, capable men of thorough mechanical training. The prospects now offered to these warrant officers—an honorable position on board ship, adequate pay, and instructive employment on shore duty—should obtain for the service recruits of a high grade of intelligence if the facts were known. The number of carpenters now afloat is barely adequate to the needs of the service, and the number on shore duty is entirely inadequate for the necessities of this bureau. The bureau recommends that, as soon as the demands upon the time of naval constructors and chief carpenters will permit, a school for the instruction of carpenters' mates should be established, as the ability of the mechanics obtained as enlisted men of the fleet as carpenters' mates, shipwrights, plumbers, and painters is of a grade entirely inadequate to the needs of the service."

During the year the following vessels have left the hands of the ship builders and have been added to the navy:

Name of vessel.	Type.	Speed required by contract.	Speed obtained on trial.	By whom built.
		Knots.	Knots.	
Alabama .....	Battleship .....	16	17.013	Cramp & Sons.
Wisconsin .....	Battleship .....	16	17.174	Union Iron Works.
Stockton .....	Torpedo boat ....	25	25.79	Wm. R. Trigg Co.
Bailey .....	Torpedo boat ....	30	30.198	Gas Engine & Power Co.
Barney .....	Torpedo boat ....	28	29.04	Bath Iron Works.
Shubrick .....	Torpedo boat ....	26	26.07	Wm. R. Trigg Co.
Bagley .....	Torpedo boat ....	28	29.15	Bath Iron Works.
Biddle .....	Torpedo boat ....	28	28.57	Bath Iron Works.

### INGOTS AND RAILS IN THE UNITED KINGDOM.

Statistics which have been collected from the manufacturers by the British Iron Trade Association show that the total make of ingots by the open-hearth process in the United Kingdom in the first half of 1901 was 1,630,958 tons, which is a record figure, the next largest production having been 1,624,823 tons in the first half of 1900. The total output of acid open-hearth steel ingots was 1,473,996 tons, while the output of basic ingots was 156,962 tons. The total output of Bessemer steel ingots in the United Kingdom in the first half of 1901, as ascertained by the British Iron Trade Association, was 791,925 tons against 1,038,279 tons in the first half of 1900. As, however, the make of Bessemer steel ingots in the second half of 1900 was only 706,735 tons, the make for the first half of 1901 was better than that of the immediately preceding six months. The total quantity of Bessemer steel rails produced in the United Kingdom in the first half of 1901 was 398,575 tons, which does not compare unfavorably with the total make of 1900, when the production was 759,844 tons, nor with that of 1898 when the production was 751,591 tons, but is behind the rate of production in 1899 when the total rail output was 838,148 tons.



## ADMIRAL MELVILLE'S REMEDY.

HE SUGGESTS MEANS OF MAKING THE PERSONNEL BILL EFFECTIVE—THE NEED OF AN ENGINEERING LABORATORY.

In the abstract given in last week's issue of the annual report of Rear Admiral George Wallace Melville, chief of the navy bureau of steam engineering, it was pointed out that there had been retrogression rather than advance along engineering lines in the navy during the past two years. This fact is so well recognized that numerous critics have even gone so



REAR ADMIRAL  
GEORGE WALLACE MELVILLE.

far as to suggest that a separate engineer corps is again a necessity and that the time is opportune for the enactment of such legislation. The admiral declines to entertain such a suggestion at the present time, for he believes that it only requires a more liberal and different interpretation of the personnel law to secure many of the advantages that were contemplated by its originators. The practical working of the amalgamation scheme thus far has been, in great part, to take the junior half of the old engineer corps and transfer them to line duties. Individual officers of the old line have conscientiously striven to perfect themselves in engineering duties, but up to the present time no systematic measures have been taken to train officers for the engineering needs of the future. For every three commissioned officers taken from the engine room and transferred to deck only one commissioned officer from deck has been sent below—and even this does not

completely describe the extent of the depletion of the engine-room supervision. The officers sent from the engine-rooms were transferred to the deck for permanent duty, while in most cases the junior officers transferred from the deck have done engine-room duty only for short periods. In order to improve existing conditions as well as to provide for engineering necessities of the future the admiral makes the following recommendations:

THE ADMIRAL OUTLINES THE REMEDY.

First—That the policy lately inaugurated of detailing junior officers of the line exclusively to engineering duties be greatly extended.

Second—That a post-graduate course of instruction in marine engineering and design be established at the naval academy for those junior officers of the line who desire to familiarize themselves with marine engineering.

Third—That at least two war vessels be used in part for the general training of firemen. In the British navy the training of stokers is systematically carried on in the cruisers *Northumberland*, *Nelson*, and *Bellerophon*, vessels of 10,000, 7,600, and 7,500 tons, respectively. In these ships the stoker is taught that he has not only hands to use but a mind to employ. After a course of instruction the recruit has a better chance of becoming for naval purposes not only a handy man but a reasoning creature. Such an eminent authority as Lord Brassey recommends that the modern armored cruisers *Powerful* and *Terrible*, ships of 14,000 tons displacement and 25,000 H.P., be employed for the special training of the engine-room complements of British war ships. Fighting ships are even looked upon by the British admiralty as desirable for the training of sailors. It has been officially announced by Lord Selborne that the squadron of training ships will not be resuscitated. Instead of developing the sailor lads on the royal yards it is proposed that they be sent to sea in fighting cruisers. This significant action by the British admiralty shows the trend toward mechanical training for the entire ship's force.

Fourth—That several torpedo boats be kept in commission for the training and instruction of the machinists and water tenders of the torpedo boat service.

Fifth—An urgent necessity has arisen for the training for naval duties of the youthful and inexperienced machinists enlisted in inland cities. These young men can be induced to seek a life career in the navy if some substantial recognition is accorded faithful, efficient, and continuous performance of duty. The number of chief machinists now in the navy is simply inadequate for existing needs, and a sufficient complement can only be secured by giving the machinists, second class, a systematic and thorough course of instruction so as to make them familiar with the care, operation, and repair of the various auxiliaries used in the naval service. These auxiliaries include capstan, blower, and winch engines; evaporators and distillers; refrigerating, hydraulic, and pneumatic machinery; also the simple forms of electric motors. These machinists should be instructed as to the manner of making all kinds of joints used for high-pressure purposes, the method of packing various forms of stuffing boxes, and, in general, the manifold duties that must be performed in the engine department of a modern war ship. It would be extremely advisable to send all machinists, second class, to a navy yard for practical work on ships under repair for several months. The experience and knowledge that they would gain from this experience would make them more efficient for duty on board ship, and the navy would be the gainer from having such men trained, in great part, at a navy yard where the diversity of work on repairs would develop all who had an aptitude for a naval career. If such a course of instruction is provided, it can be confidently predicted that the corps of warrant machinists can be recruited from this source alone. As it is not probable that all the deserving machinists can from henceforth expect to secure warrant rank, I would urgently recommend that all machinists among the enlisted force who have served honorably for a period of twenty years be only assigned to duty at navy yards. There is much duty that these men could do at the naval stations, such as running tugs, taking charge of the steam fire engines, looking out for the various boiler plants, and taking charge of the machinery of the ships in ordinary. Under existing conditions, machinists only remain long enough in the service to fit themselves for taking positions in the merchant marine. They are lost to the naval service just when they are most efficient, and such a deplorable state of affairs should be remedied, if possible. I believe that the department has only to offer some substantial reward in the form of permanent

duty at a navy yard to induce many machinists to render twenty years' faithful service, and to look upon the navy as a life career, and not as a temporary vocation which affords an opportunity for travel and sight-seeing.

Sixth—That the warrant machinists be placed upon the same footing as regards pay and rank and emoluments as given other warrant officers. In some respects the warrant machinists are discriminated against, and so long as this distinction exists they will have a grievance which must interfere with the efficiency of the engine-room force. Every avenue to promotion and increase of pay that is accorded other warrant officers should be given warrant machinists. The responsibility and character of the duty that rests upon this class of officers is as important as that devolving upon sailmakers, carpenters, boatswains, and gunners, and the opportunity for advancement should be equally as great.

Seventh—That a special rate of pay be allowed those petty officers in the engine department who qualify as water tenders of torpedo boats. Such a substantial reward is given those who qualify in certain deck duties, and the same inducement should be held out to the leading petty officers doing duty beneath the protective deck. In connection with this subject of personnel there are features whose importance should be impressed upon the service at large. It is a certainty that the number of officers, doing engineering duty only, will diminish much more rapidly than is anticipated, and probably much sooner than is desired. By reason of the present interpretation of the personnel law the inducements for such officers to continue this work are very few. As attractive retirement features of the personnel law will soon be applicable to the majority of such engineer officers, it can be expected that the opportunities offered will be taken advantage of by many who are now doing engineering duty only. It would also be well for thoughtful naval officers to compare our work in training an engineering personnel for the future with efforts that are being made by other naval powers. Is the engineering course at Annapolis comparable with that given the British engineering cadets at Keyham? Are we in advance or behind other nations in systematically training the petty officers and stokers of the engine-room force? The war ships of the future must be provided with a strong complement of commissioned engineer officers. The number and character of the enlisted force working beneath the protective deck, as well as the extent and complexity of the motive power, demand and require that there be detailed, for this supervision, a complement of educated officers possessing ability and high character. Either the junior officers of the line must be compelled to take up this work, or public sentiment will demand that the warrant officers be advanced to official positions commensurate with duties imposed upon them.

THE NEED OF AN EXPERIMENTAL LABORATORY.

The admiral calls attention to the great necessity and immeasurable value of engineering experiments and suggests that as the sum of \$7,000,000 is to be expended in buildings and appliances for the rehabilitation of the naval academy an engineering experimental laboratory might be added to that institution. The primary necessity and reason for conducting experiments and tests is the increased efficiency of the naval service. A secondary and probably equally important reason for the establishment of the station at the naval academy lies in the fact that the laboratory can be made available for the purpose of instructing the cadets. As a post-graduate course of engineering will undoubtedly soon be established at the naval academy there will be justification for an experimental station at the institution for this purpose alone. The laboratory would be of incalculable benefit for the testing of many patent appliances which inventors offer for a government test and which may prove useful or economical for the naval service. The admiral says that the leading marine engine builders, consulting engineers and talented professors at various technological schools have repeatedly urged him to impress upon congress the necessity for such a laboratory. He says that the following are some of the problems that the navy should, at least, assist in solving:

"The best means for utilizing liquid fuel for naval and maritime uses—A new impetus has been given the consideration of this subject by reason of the discovery of the Texas and California crude oil fields.

"The value of the steam turbine for naval purposes—The British admiralty regards this subject as of vital importance, and the success achieved with the two torpedo boat destroyers installed with this appliance warrants increased attention being given to the matter.

"Form and size of propellers, their location with reference to the keel and sternpost, the character and area of the blade, etc.—The experience of the various torpedo boat builders during the past five years conclusively shows the necessity of extending investigation of this subject. The tests made by this bureau twenty-five years ago were exceedingly valuable, and urgent requests have been made that more experiments of this nature be conducted.

"The value of electricity as a prime mover for naval purposes—In the United States navy the use of electricity is more extended than in that of any other service. Its endurance for naval purposes has been seriously questioned by others. Systematic tests and experiments would undoubtedly prove exceedingly beneficial.

"The corrosion of boiler and condenser tubes—The rapid deterioration of both boiler and condenser tubes seriously decreases the engineering efficiency of the modern war ship. The bureau has made some important tests in connection with this matter, but the necessity for further investigation and experiment is exceedingly apparent.

"The best form and type of water-tube boilers for naval purposes—There are military and tactical reasons why our navy should soon settle upon an approved type of boiler. There are so many factors that will interfere with boiler efficiency that extended experiments are necessary to secure valuable information upon the subject. In the investigation of this subject alone a very liberal appropriation could be profitably expended.

"The possible advantages resulting from extended use of compressed air as a motor—Particularly at navy yards, and even upon repairs to ships in commission, the extended use of compressed air could be advantageously employed.

"The balancing of marine engines—There is a progressive tendency to increased piston speeds, and with each succeeding year the necessity for more perfect balancing becomes necessary.

"The development of the storage battery for marine purposes—The discovery of a storage battery of decreased weight but increased endurance will greatly advance the use of electric motors in the service.

"The perfection of a more reliable and efficient gas engine—The



danger attending the use of this motor now makes it inadvisable for extended use in the navy.

"Extended investigation as to the best forms of steam, hydraulic, and pneumatic joints—By reason of the development of the water-tube boiler the tendency is toward increased pressure. Considerable trouble has been experienced in making joints.

"In the solution of these important problems the matter of expert talent is very important in conducting tests. It can never be doubted but that a capable and strong force of engineer officers will always be stationed at the naval academy, and therefore there will always be available highly trained officers for conducting experiments if the engineering laboratory is established at Annapolis. By detailing one of the former engineer officers as director of the laboratory the necessary continuity of plan and direction of work is assured. In the solution of many problems the staff of the experimental station will require careful and conscientious assistants, and this force of observers could often be recruited from those senior cadets at the academy who possess engineering talent and inclinations. By utilizing the cadets in this way the young officers would acquire valuable experience which would be highly useful in their future career. There could certainly be secured no more zealous and conscientious observers than from the naval academy, where the standard of professional honor is exceptionally high.

"With an established experimental station, equipped not only with the best but exceedingly and complete appliances, important tests and experiments could be carried on continuously and efficiently, and not in the interrupted and desultory way in which most experiments have heretofore been made. The value and importance of such a station would be greatly appreciated by mechanics and inventors who have not the financial ability to perfect and test their patented appliances. While it is always within the power of wealthy corporations to determine the worth of inventions submitted to them, the humble inventor is often deprived of his just reward because he is compelled to permit his more fortunate neighbor to determine the value of his invention. As an engineering laboratory and experimental station would test all appliances relating to naval purposes at slight cost to the inventor, those submitting appliances for test would be assured of the fact that the absolute results of all experiments would be communicated and that a just and impartial professional report would be submitted.

"Given such an institution and its facilities the inventive genius and professional aspirations of officers and men of the naval service would be encouraged and expanded. Under existing conditions the zealous and studious officer is often discouraged and repressed because there are neither facilities nor funds to test the merits of inventions and plans submitted by him. As an illustration of the far-reaching importance of the development of a simple idea or invention, I would refer to the perfection by Whitworth of the means of securing a simple plane surface. The development of his idea has made possible the manufacture of the powerful and wonderful lathe, which today turns out the large guns used on the war ship. It may be said with truth that the tests made by Whitworth in England, and Sellers in America, so improved the scope and capacity of the machine tool that the ordnance expert of today is more of a mechanical than a military engineer. There are hundreds of officers in the service who fully appreciate the importance and necessity of this work. There are scores of skilled and enthusiastic experts who desire to devote their time and talents to such research. With such an experimental station the work of training an engineering reserve for the future will be greatly promoted. If such a building, properly equipped, is established at the naval academy it will advance the status of engineering in the navy. It will make manifest the determined intention of the department to compel the naval cadets to qualify in engineering studies. The wonderful stride made by Germany during the past ten years in marine engineering can in great part be ascribed to the matchless work of the Charlottenburg engineering station."

The admiral concludes his report by saying that the bureau is in need of room. There is now in process of construction for the navy a large number of powerful ships. By the terms of the contracts for these vessels a large number of drawings is required to be furnished by the builders and these drawings must be carefully preserved. Even now it is almost impossible to properly file and care for these drawings. On the other hand, the bureau renders valuable service to ship building and marine engineering plants in supplying them with blue prints of marine machinery and special appliances. In fact every firm in the country that has built a naval vessel has been the recipient of the department's bounty in this respect. As a single illustration of the assistance expected by firms securing their first contract for an armored ship one marine engineering establishment has requested that several thousand blue prints of drawings be furnished them. In fact, it has been in part because the policy of the department has been so liberal in this respect that nine firms are now able to build battle-ships where only four plants could do it less than five years ago.

### LIFE BOAT AND LAUNCHING APPARATUS.

A DESIGN SUBMITTED BY MR. C. F. SULTEMEYER WITH SOME COMMENTS ON THE ATTITUDE OF THE POLLOK PRIZE JURY.

The following letter from Mr. C. F. Sultemeyer, 1448 N. Halsted street, Chicago, with accompanying illustrations, is self explanatory. As the device is apparently of some value, Mr. Sultemeyer invites discussion upon it and will be pleased to receive suggestions from anyone from the technical standpoint. He says:

"The Marine Review of Oct. 3 contains an article headed 'Anthony Pollok Prize not Awarded,' from which it would appear that the jury in the second competition for this prize was looking for a life saving device capable of 'saving, in a body, the crew and passengers in case of a wreck,' and that the jury rejected all devices which failed to meet the requirements for 'collective saving of life.'

"Is it not rather misleading for the jury to use such terms as 'saving life in a body' and 'collective life saving apparatus,' which may be construed to mean that a passenger vessel should be equipped with a life saving apparatus capable of saving the lives of 1,500 or 2,000 people? I believe that you will agree with me that the placing of such a device on board the ordinary passenger vessels is an utter impossibility, especially if it is taken into consideration that the space available for such a device

is the same that is now available for the life boats, since all 'objects standing or lying about on deck, blocking up the space reserved for passengers or goods and obstructing the loading and discharging operations' are barred out. It would have been better if the jury had been a little more explicit in regard to this matter. As many of your readers no doubt take an interest in this subject, I take the liberty to submit to you herewith a few remarks on the question of what constitutes an effective and reliable life saving apparatus for use on board a passenger vessel.

"The conditions governing the design and construction of an effective life saving device may be summed up as follows, all parts within the single quotation marks being taken from the article of Oct. 3: 'The devices must be capable of being utilized by all on board ship without the

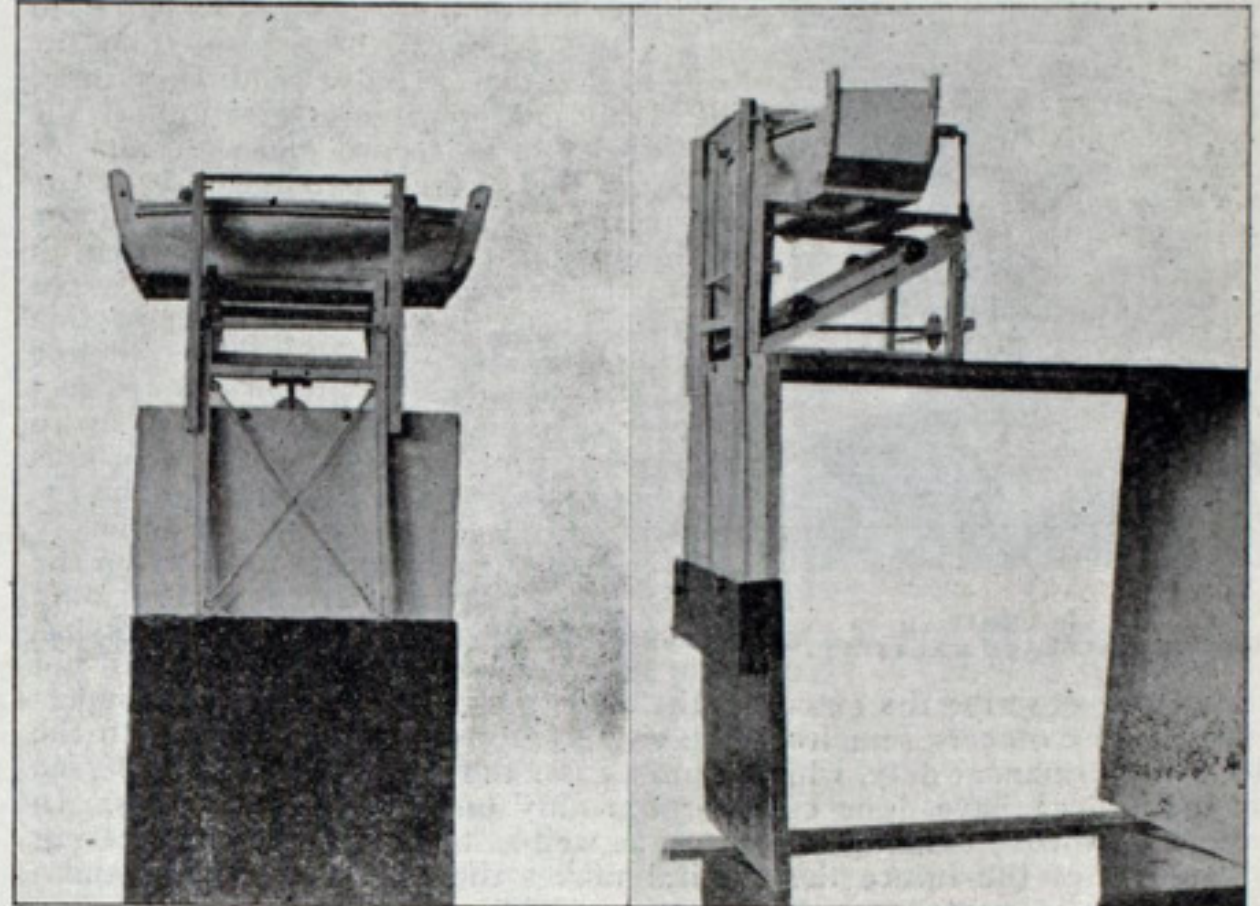


FIG. 1.

FIG. 2.

slightest delay.' 'Everything not answering to this indispensable condition is useless.' 'Such old-fashioned objects for the safety of individuals as belts, waistcoats, buoys, etc., are out of the question, also objects standing or lying about on deck, blocking up the space reserved for passengers or goods and obstructing the loading and discharging operations; inventions which, taken by themselves, would simply be an improvement of systems already recognized as inadequate for saving life in large numbers.' 'Also floats, rafts, etc., requiring to be set up, put together, or inflated (by hand) at the moment of danger.'

"It will be seen, therefore, that the field open for the inventor is very restricted indeed; in fact, he is confined to the space now occupied by the ordinary life boats and must find a more serviceable substitute for these and a better means for securing, releasing and launching them. The boats must be larger than they are now, and must be so constructed that people can conveniently enter them before they are released and launched. The mechanism for releasing and launching the boats must also be so simple that any one man may operate the same without any trouble, nor should the man who launches the boats be left behind in case the ship is abandoned. The whole device must neither be too heavy nor too expen-

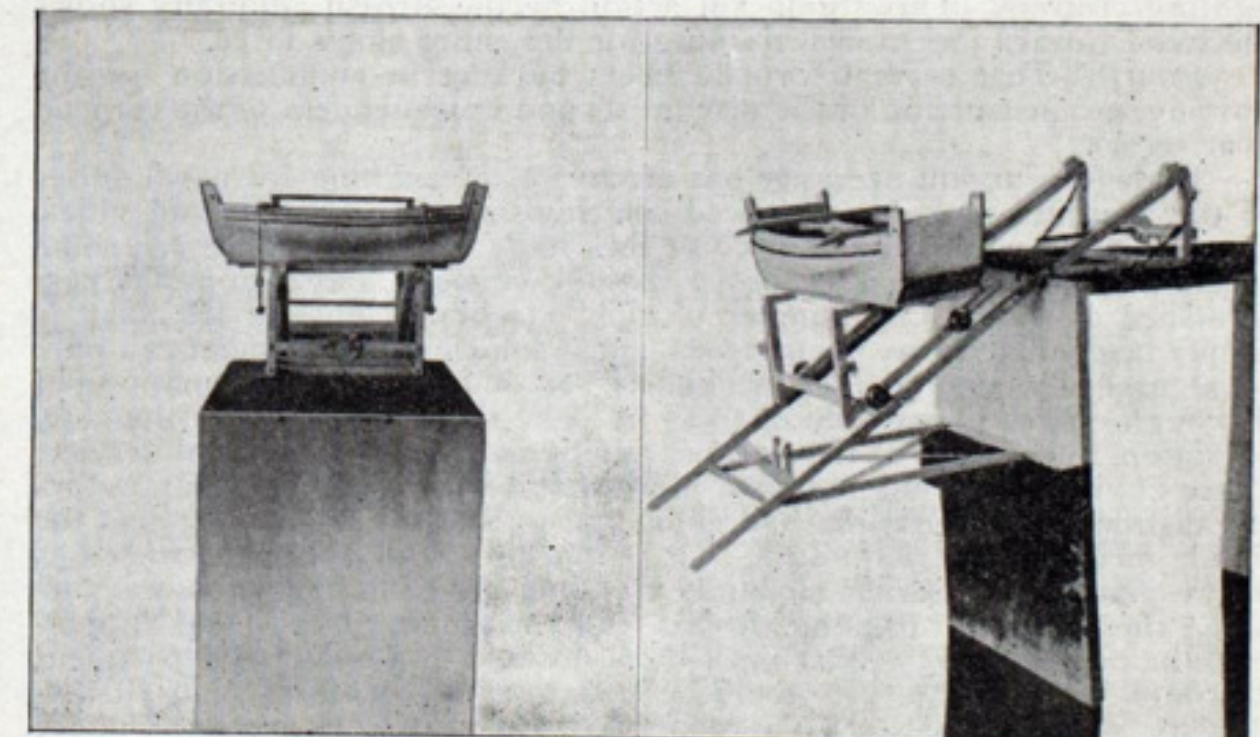


FIG. 3.

FIG. 4.

sive, and all parts must be visible and accessible for the purpose of inspection at all times. Finally, the boats should be so constructed and arranged that they may always be kept uncovered and exposed to the weather; and the passengers should be allowed to freely enter the same during the voyage. The 'no admittance' sign should be taken down.

"The next question to be decided is the relative size and number of devices to be carried on board each vessel. If for the sake of argument we concede the possibility of constructing one single device large enough to provide for all the passengers and crew 'in a body' or 'collectively,' we would still have to figure with the fact that this one device may, in case of collision, be itself disabled, thereby crippling the whole life saving system. The answer to this proposition makes it imperative to have at least a sufficient number of devices on board each vessel so that the destruction of one would not necessarily endanger the whole system or even impair the total capacity to an appreciable extent.

"In order to design and construct a life saving apparatus that answers



all the conditions and requirements enumerated above, we must not lose sight of the fact that the apparatus is intended to be a life saving device and should therefore be easily discernible as such. It must always be considered a mistake to utilize certain objects on deck of a vessel in a dual capacity, i. e., to turn benches into rafts, hatch covers into floats, etc., if passengers in general are ignorant of the fact and only find out if some one who knows perchance informs them of it. Aside from this it is poor policy to have too many different devices in case of a hurried abandonment of a sinking vessel; it is system that is needed then, the simpler the better.

"As a result of these investigations I have constructed a model of a life boat and launching apparatus and take the liberty to send you photographic views of the same herewith. No. 1 shows boat or float secured on deck; No. 2 is a side view, coupled together into one, resting on the launching device; No. 3 is a rear view, seen from the deck; No. 4 shows boats released and descending into the water. The launching device consists of a cradle fastened to the upper or boat deck, two slide beams, and supports fastened to the side of the vessel. The slide beams are so arranged that they can be drawn up to the side of the vessel as shown in No. 2. A rod run through the back of the cradle engages the supports of the slide beams, which are drawn in and held tight. The carriage supporting the boat or float is wedged in between the slide beams and the top of the cradle. The cross-beams shown on the boat and float are passed under hooks fastened to the inner slide beam and are screwed down on the other side as shown in No. 3. The fastening rods for screwing down the boat in the rear are so arranged that they will release themselves as soon as the boat is lowered, and the hooks engaging the cross-

#### AROUND THE GREAT LAKES.

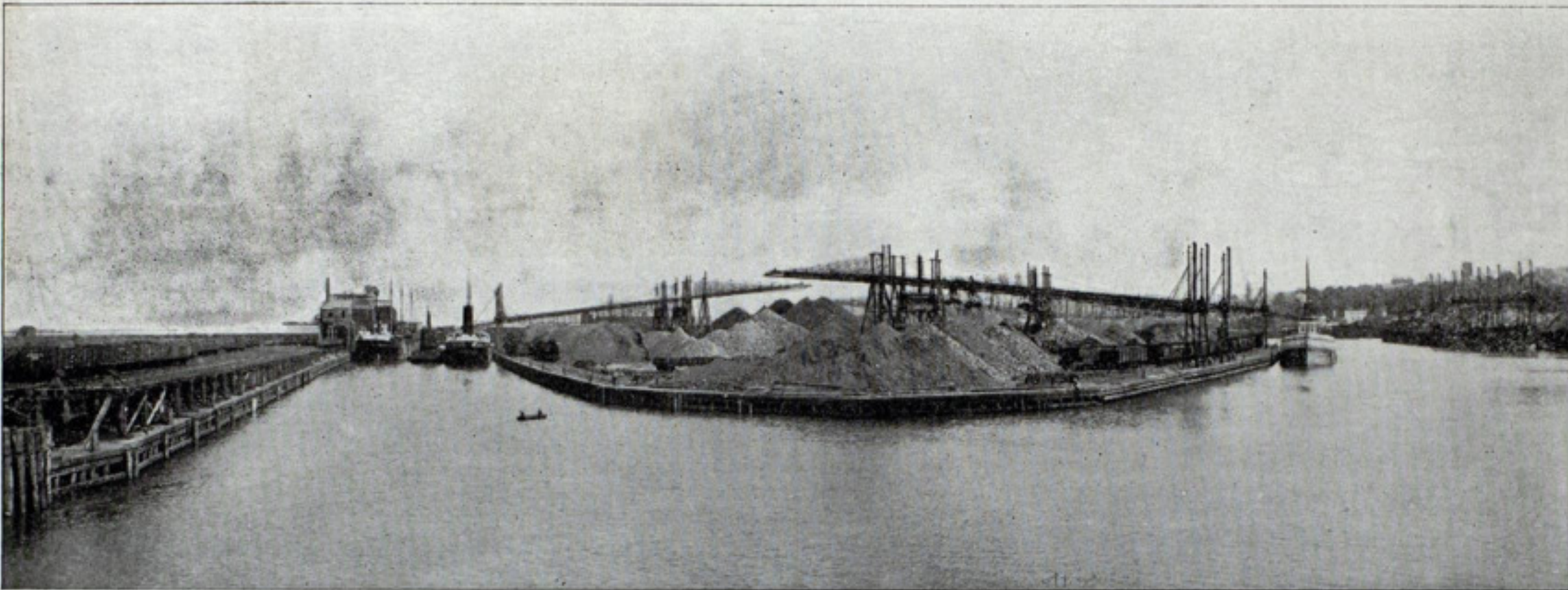
The first of the large side-wheel steamers for Detroit and Buffalo service, building at the Wyandotte works of the Detroit Ship Building Co., will be launched in about three weeks.

United States engineers in charge of the lake survey are still issuing harbor charts. The harbors of Fairport, O., and Muskegon, Mich., (including Muskegon lake) are the latest. They may be had from the Marine Review.

Two of the Northwestern Steamship Co.'s vessels, which were built for service between Chicago and European ports, are on their way from the lakes to New York, where they will be turned over, under charter, to James W. Elwell & Co. The vessels are the Northman and Northwestern. Elwell & Co. will operate them between Savannah, Fernandina and New York.

Citizens of St. Clair, Mich., held a meeting on Wednesday evening to raise funds to donate a ship building site of 1,000 ft. frontage on the St. Clair river, just below Oakland, to Messrs. J. E. Botsford, F. D. Jenks and C. Q. Duncan of Port Huron, who are contemplating establishing a steel ship building plant for the primary purpose of building freighters. A finance committee of nine was appointed to canvass among the business men.

The Western line steamer Chicago, recently completed at Buffalo, will be in commission this week. She will be sailed by Capt. Stephen Jones, formerly of the Mohawk, and her engines will be in charge of Henry Hess, who was chief engineer of the Buffalo. Wm. McNulty of the



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CLEVELAND & PITTSBURG ORE DOCKS, CLEVELAND—FROM MARINE REVIEW COLLECTION OF SIMILAR VIEWS.

beams on the other side slide off by the same operation. In order to launch the boat it is necessary only to turn the rod in the rear of the cradle, releasing the slide beams, which will then drop down forming a clear passage for the boat into the water.

"The method of launching boats in this manner appears to be a very successful one. The model was tried under all possible conditions, but no serious difficulties were noted. The float never made a drop of water when launched, although it was often dropped from an abnormal height. The use of the carriage causes the boats or floats to fall as nearly horizontal as possible and helps very materially to break the fall. I shall be pleased to place a working model at the disposal of any one who is interested."

#### VIEWS OF LAKE SHIPPING.

A view of the Cleveland & Pittsburgh ore docks on this page, made by the Detroit Photographic Co., is selected for the purpose of directing attention to several hundred views of harbors, docks, ships, etc., throughout the lake region, which are gradually being collected by the Marine Review Pub. Co. in such form that prints may be readily examined by anyone interested. The picture with its accompanying piles of ore, hoisting and conveying machinery, is merely one from a large number of similar views already in hand. It is proposed to have photographs of every possible phase of marine work and to be prepared to fill orders of whatever nature. The list of photographs of vessels is already extensive and will eventually embrace every ship of consequence on the great lakes. Several sources will be drawn upon for this supply but the pictures will come mainly from the Detroit Photographic Co., one of the greatest concerns of its kind in the world.

The steel car industry of this country is certainly assuming immense proportions. The Pressed Steel Car Co. might be called a new concern and yet its output of cars to date aggregates 50,091—enough to make a train 300 miles long. It is reported from Philadelphia that the Pennsylvania Co. will today place orders for 12,000 to 13,000 cars. A list made up a few days ago included 5,000 pressed steel hopper coal cars; 5,000 gondolas, also pressed steel; 1,000 steel boxes; 500 flat cars with pressed steel underframes, and 500 refrigerator cars.

A chart of the Detroit river in colors—the best chart of the river ever printed—has just been issued from the Detroit engineer office. It takes in everything from Windmill point to Bar point. All the changes resulting from extensive dredging, shifting of ranges, etc., are very clearly shown, and the corrections are, of course, up to date. This chart may be had from the Marine Review.

Auburn will succeed Engineer Hess in the Buffalo. Changes among masters of the Western line, due to the Chicago going into commission, are: Capt. John Davis of steamer Boston to the Mohawk, Capt. Henry Murphy of the Rome to the Boston, Capt. F. D. Asborn of the Vanderbilt to the Rome, Capt. F. E. Johnson of the Montana to the Vanderbilt. John McKinnon, first mate of the Troy, is promoted to be master of the Montana.

The chief of engineers has made the following estimates for improvements along the great lakes in his report to congress: Harbor at Duluth and Superior, \$459,727; harbor of refuge at Grand Marais, \$70,000; harbor of refuge, Milwaukee, \$125,000; Chicago harbor, \$150,000; Calumet harbor, \$419,480; Calumet river, Illinois and Indiana, \$60,000; Illinois river, Illinois, \$130,000; Michigan City harbor, \$68,000; Holland harbor, \$73,000; Muskegon harbor, \$75,000; Ludington harbor, \$75,000; harbor of refuge, Portage lake, \$59,000; Frankfort harbor, \$54,500; harbor of refuge, Sand Beach, \$57,500; Hay lake channel, St. Mary's river, \$144,115; Detroit river, \$136,500; Erie harbor, \$125,000; Buffalo harbor, \$225,000; Tonawanda harbor, Niagara river, \$150,000; Oswego harbor, \$150,000; Cape Vincent harbor, \$100,000; for survey of northern and northwestern lakes, \$200,000 is asked.

The United States hydrographic office has just issued a new volume (108C) of sailing directions for Lake Huron, Straits of Mackinac, St. Clair and Detroit rivers. The volume is uniform with the new series now published of the other lakes and is brought up to Sept. 28, 1901. The new matter is incorporated in so many places that it is difficult to mention all of the additions, but one feature in particular deserves special attention. Pages 185 to 200 is taken up with the "Barometer and the Law of Storms." This is specially written with regard to the lakes and gives the clearest exposition of the subject we have ever seen. It explains very clearly how any captain can anticipate the weather by systematic comparison of the weather reports issued by the weather bureau of the United States. There is much other matter of interest in the new publication which should be in the hands of every lake captain and vessel owner. The price of the book, alike to sailing directions for other parts of the lakes already issued, is 30 cents. It may be had from the Marine Review.

Mr. Julius Chambers, No. 24 Murray street, New York, has written a book entitled "The Destiny of Doris," which is issued from the press of the Continental Publishing Co. To get what the artists call color for the book, Mr. Chambers traveled 12,000 miles, visiting all the countries of the Mediterranean and the sources of the Nile. All of these countries are the background of the story. The book is superbly illustrated with 200 photos and wash drawings. It is spoken of as a most agreeable holiday present. Mr. Chambers is one of the most famous newspaper men in the country.



## RECORD YEAR IN SCOTCH SHIP YARDS

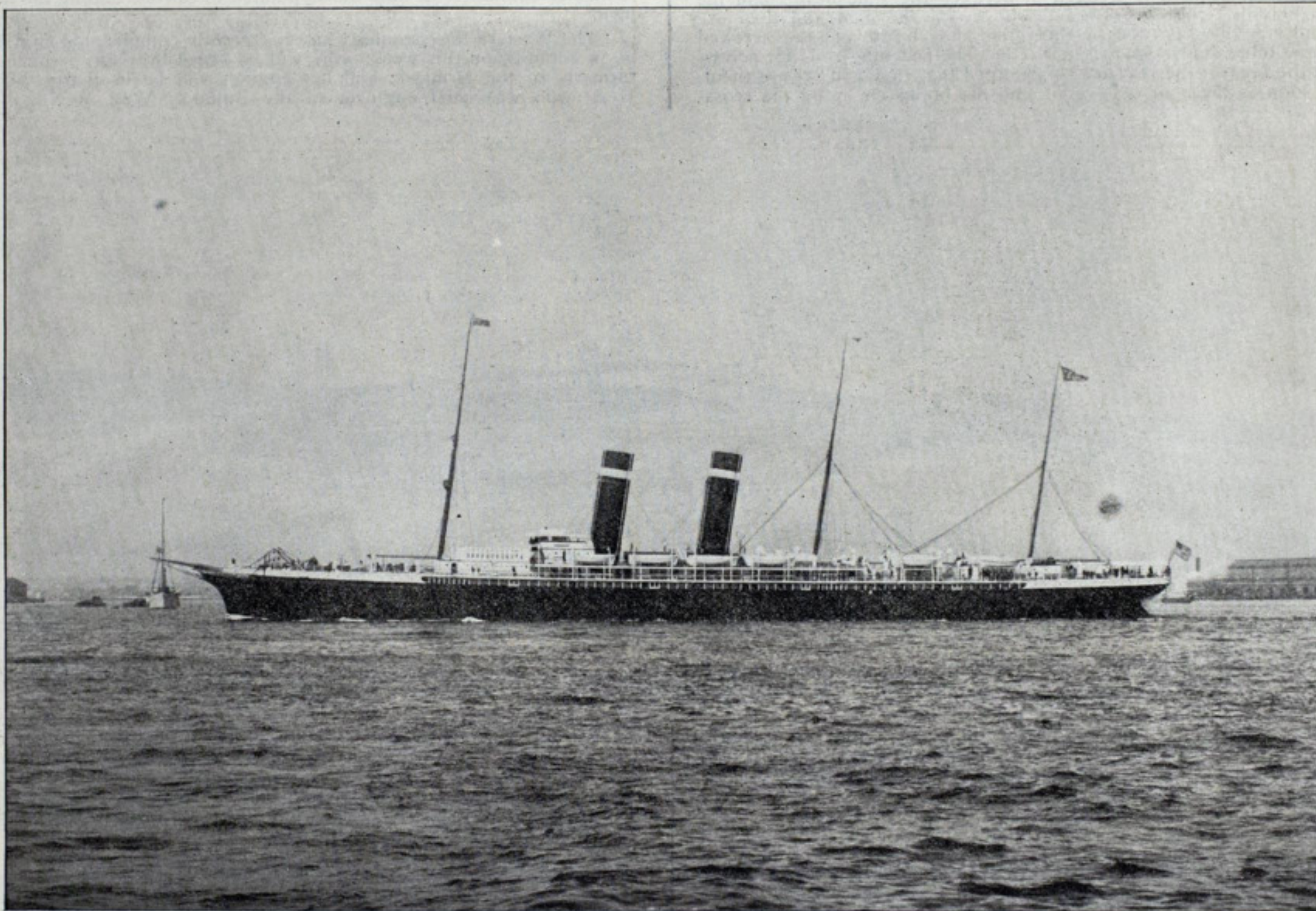
AND YET THE OUTLOOK IN FREIGHTS IS THE WORST FOR A LONG TERM OF YEARS—OVER-PRODUCTION OF SHIPS—SCOTCH LETTER.

[Special correspondence to the Marine Review.]

Glasgow, Scotland, Oct. 20.—The fourth quarter of the commercial year is entered upon with gloomy prospects as far as the shipping trade is concerned. Ship builders are all right in the meantime, but ship owners have good reason to be alarmed at the continuous and prolonged drop in freights. It is practically in all directions, and the decline in freights has not been accompanied by a corresponding decline in the working costs of steamers, for coal, stores, wages and insurance remain as high as when freights were very much higher. Once more ship owning has become an unprofitable business, and yet there seems to be any number of people willing and anxious to go into it. This, at least, may be inferred from the amount of building now going on, not only in this country but in all parts of the world. There is little doubt this will prove a record

have to compete against the regular "liners" with their peculiar facilities for collecting and handling cargo. While the demand for new "tramps" has been meantime suspended, it will revive again at the first brightening on the horizon—whether it be by an improvement in freights or by a lowering of costs. The proceeds of old ships, sold at a profit, are waiting investment, and yet before the winter is over there will probably be fleets of ships laid up in our docks and harbors, as the lesser of two evils. And this may happen while our ship yards are humming away full peg, for most of them are well enough booked to keep them going until next summer. After that—the deluge! When writing on August 22 last, I commented on the large amount of new contracts that had been booked during the summer, and said that it is not usual for ship builders to book much in June and July, the active contracting season being August to October. The drop in freights has "upset the apple-cart" and booking since the end of August has been only trifling, although in August itself a good deal was placed.

There is no change in the prices of material since my last report but the recent rise is being barely maintained and it seems evident that the top has been reached for the present. Indeed it is difficult to resist the impression that we shall soon see a downslide again, for, while the demand



THE AMERICAN LINE STEAMSHIP PHILADELPHIA. LENGTH, 500 FT.; BEAM, 63 FT.; TONNAGE, 10,800 TONS.

year in the annals of ship building, and yet it is the worst of a long term of seasons in the annals of shipping. There is, of course, something of cause and effect in both situations. The freight markets are now suffering from the effects of over building, and British shipping, in especial, is suffering from the competition of second-hand British vessels, sold to foreigners who can, and do, run them much more cheaply than we can under our merchant shipping laws. If Commissioner Eugene T. Chamberlain and Senator Frye would only take the trouble to inform themselves how very severely British shipping is hampered and harassed by these laws, they would cease to talk of the imaginary encouragement given to British shipping by the British government. If the select committee of the house of commons appointed to inquire into the whole subject of foreign bounties and subsidies to shipping, and the effect of them on British trade, conclude their labors by recommending some relaxation of these irksome laws, our ship owners will be truly thankful. They want no subsidies if they can be relieved from governmental fussiness and faddism.

The year is winding up with too many ships in the world, and yet with large additions in active preparation. In Scotland, as I have previously pointed out, there is now considerably more work on hand at the ship yards than there was at the beginning of the year. In the month of September we put 40,000 tons of new vessels into the water, bringing up the total for the nine months to 395,420 tons, 30,000 tons ahead of any previous record for any corresponding period. But the demand has suddenly stopped and the new orders booked last month, while only aggregating about 12,000 tons, consisted largely of river boats, dredges, steam trawlers, and other craft not affecting the freight situation. This month, so far, almost no new orders have been reported. The problem of the future, however, is how the numerous large cargo boats—monsters of 5,000 to 10,000 tons but of the "tramp" order—that have been lately built, and are in course of construction, are to find employment. Their scope is limited by their high draught, and in the deep ocean traffic they

will lessen, as ship building becomes less active, German and Belgium material is being pressed for sale in all directions. Moreover coal is coming down, and wages must follow.

The success of the turbine steamer King Edward on the summer passenger service of the Firth of Clyde has been so great that Messrs. Wm. Denny & Bros. of Dumbarton, Scotland, have already engaged to build two more of the same type of vessel for next season. The absence of all vibration is the great charm of the turbine boat for pleasure service. Sir Christopher Furness, M. P., the well-known ship builder and ship owner, is having a turbine steam yacht built by Messrs. Alex Stephen & Sons, Ltd., Linthouse, Glasgow. She is to be a boat of 750 tons, to develop very high speed under very comfortable conditions. The Parsons company will supply the turbine machinery. The Clyde will then be the first supplier of turbine yachts, as well as of turbine river boats. As yet, however, we have not built any submarines, and Clyde ship builders are watching with great interest work at the Vickers Sons & Maxim company's yard at Barrow, where five submarine boats are approaching completion for the admiralty.

The Vickers Sons & Maxim Co. has just completed the armored cruiser Hogue, upon which an important new departure is being made. The admiralty intend to make use of this cruiser for a variety of experiments in the employment of electricity with the view to determining the relative economy of electricity and steam for miscellaneous purposes. All the fans, auxiliary engines, steering gear, capstans and windlasses will be fitted (temporarily at any rate) with electric motors. The application of electricity to any of these purposes is not new, but the application of electricity to all of them at once, is. The experience of the American navy in the employment of electricity for steering gear and boat hoists was not regarded as very encouraging by our naval authorities from an economical point of view. The Russian navy has, I believe, adopted electricity more extensively than either the American or the British, even to the working of the guns, but I am not aware with what result. The

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experiments on the Hogue will be instructive to both Americans and Britons.

In this connection may be named an experiment in electricity for marine purposes which is being made in Germany. Taking the hint, no doubt, from the method employed at Los Angeles, Cal., for generating electric power by wave motion, a German engineer has patented a buoy fitted with electric generating plant. This will be actuated enough by the smaller wave motion to set in motion clock work to operate an intermitting light for shoals. A buoy on this principle is being placed at the mouth of the Elbe.

Yesterday was launched a new addition to the extensive and ubiquitous Clan line, whose development within the last twenty years or so is one of the phenomena of the shipping trade. This latest "Clan" has been built by Messrs. A. McMillan & Son, Ltd., Dumbarton, and in honor of the builders has been named Clan McMillan. She is a boat of 408 ft. length, 48 ft. breadth and 37½ ft. depth to shelter deck. Her capacity is 7,300 tons dead weight. She will have a sea-speed of 12 knots, a complete installation of electric light and a powerful search light, the machinery being supplied by the Greenock Foundry Co. Messrs. McMillan have built a large number of the Clan fleet, and they claim that the Clan McMillan beats the show. This line was originally established for combined goods and passenger service between Scotland and India, but consists now entirely of regular cargo liners trading to Calcutta, Ceylon and South India, Bombay and Western India, Persian Gulf and South Africa.

The mighty cruiser Good Hope, which was launched some time ago by the Fairfield Ship Building & Engineering Co., is now being rapidly

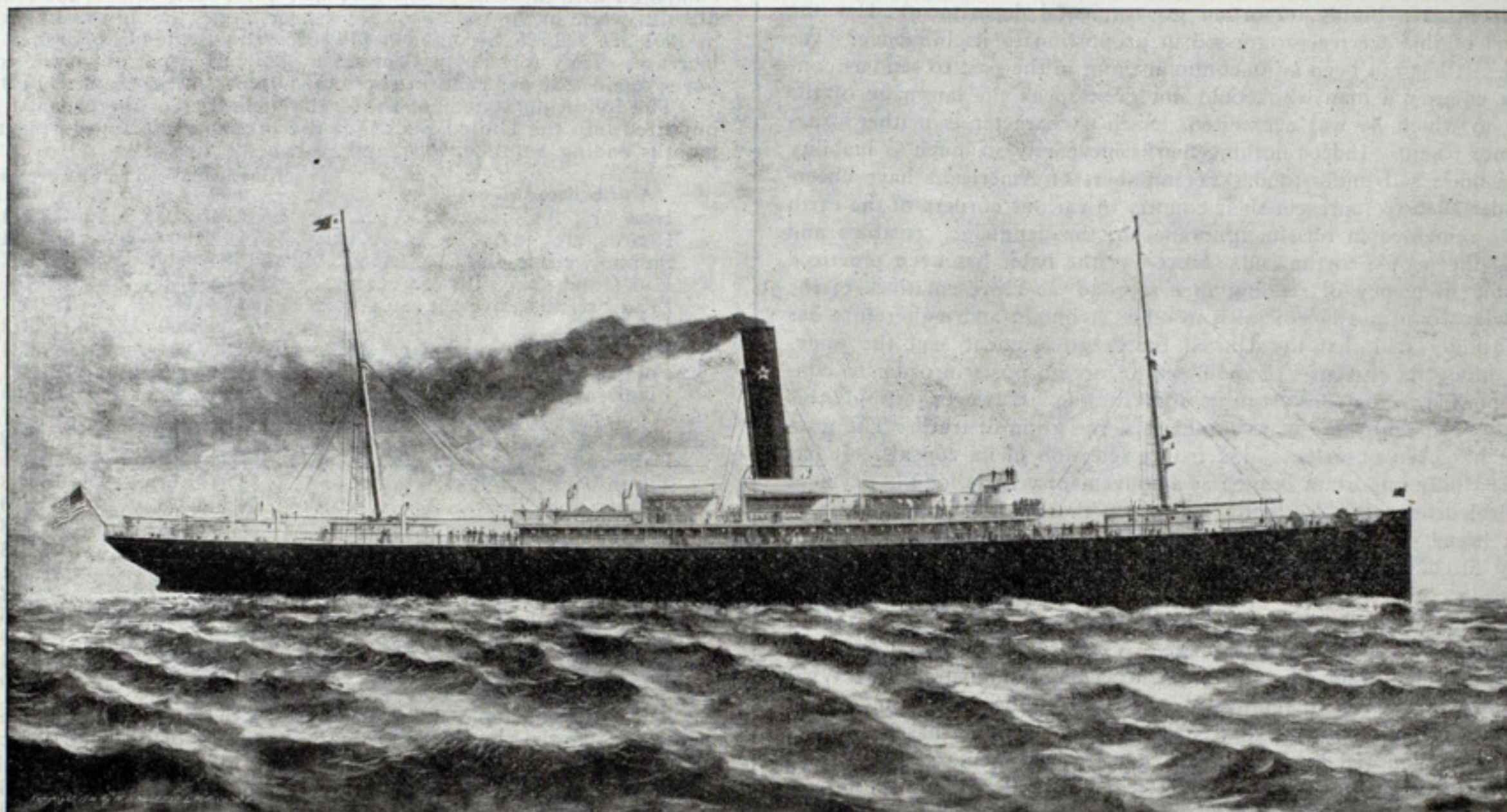
bridge was immediately closed into service, and within fifteen minutes five passenger trains crossed the river on the new Scherzer bridge. The new bridge has since been in successful operation and the railroad service has been greatly improved.

The entire work of preparing the designs and plans and the construction of the bridge, together with the removal of the old swing bridge, was under the immediate charge and supervision of Mr. George W. Kittredge, chief engineer of the Big Four railway. The Scherzer Rolling Lift Bridge Co. furnished the plans and specifications and checked the shop plans for the superstructure of the new bridge and also furnished a consulting supervision over the erection of the bridge until completion. The plans for the substructure were prepared by the railroad company.

#### MAIDEN TRIP OF THE STEAMSHIP DENVER.

The steamship Denver of the New York & Texas Steamship Co. (Mallory line) has just completed its maiden trip to Galveston and return. The steamer was recently completed at the yards of the Harlan & Hollingsworth Co., Wilmington, Del. She is 390 ft. long, 48 ft. beam and 21 ft. deep and is designed for a speed of 16½ knots per hour. She has accommodations for sixty cabin and seventy-eight steerage passengers. Both cabin and steerage equal in appearance, comfort and convenience those of any American steamship. The vessel is lighted by electricity and has a carrying capacity of 4,000 tons of freight.

The Mallory line operates direct service between the ports of New York and Brunswick, Ga., Key West, Florida, and Galveston, Texas. Its New York terminals are now being rebuilt, and when completed will



THE STEAMSHIP DENVER OF THE MALLORY LINE. BUILT BY THE HARLAN & HOLLINGSWORTH CO., WILMINGTON, DEL.

completed and will be handed over to the admiralty for her official trials before the end of the year. This cruiser is remarkable as the fastest ship of her size yet produced. She is to develop 23 knots, or very nearly as much as the much lighter Deutschland, and her machinery will weigh only about half as much as the German liner's. The Good Hope will be handed over in little more than two years from the date on which keel was laid and several months within the contract time. The Drake, sister ship, which is being built at the government dockyard at Pembroke was begun five months before Good Hope, but the contract vessel is first ready. At the Clydebank yard of Messrs. John Brown & Co., Ltd., the Leviathan, the third cruiser of the same type is making rapid progress.

BENJAMIN TAYLOR.

#### SCHERZER BRIDGE ACROSS THE CUYAHOGA RIVER.

The Cleveland, Cincinnati, Chicago & St. Louis Railway Co. (Big Four) several days ago placed in service their new double-track Scherzer rolling lift bridge across the Cuyahoga river at Cleveland. This bridge was designed by the Scherzer Rolling Lift Bridge Co., Chicago, and replaced a double-track swing bridge which was obstructive to navigation and which also frequently placed the very heavy passenger traffic crossing it at a serious disadvantage. The bridge is used by the main lines of the Big Four, Lake Shore, Erie, and other railroads and is the principal railroad bridge crossing the Cuyahoga river at Cleveland. The first Scherzer bridge constructed several years ago for the Big Four railway across the Cuyahoga river at Cleveland proved so satisfactory in every respect that the progressive management of the railroad company determined to remove the obstructive swing bridge at this much more important crossing and substitute a Scherzer bridge. Railroad traffic was constantly maintained upon the swing bridge during the construction and erection of the Scherzer rolling lift bridge. Vessel traffic in the river was also maintained, as the new bridge was erected in the upright position on the piers which support the bridge when completed, the trains being operated through the new bridge during erection. Upon the completion of the new bridge, the center of the old bridge was removed; the new

be wholly new, comprising two piers, 550 ft. long and 80 ft. wide with new sheds and large, well appointed offices. The Galveston terminals have also been enlarged, entirely rebuilt and sheds erected thereon at an expense of more than \$100,000.

#### TOWING THE ALGIERS FLOATING DRY DOCK.

The great Algiers floating dry dock is now well on its way to New Orleans. The huge structure is in tow of the Orion and Taurus of the Boston Towboat Co. The Orion has aboard 2,000 tons of coal. Even her decks are covered with the fuel. The Taurus will coal at sea whenever the weather permits. Each boat is provisioned for two months. It was extremely difficult to get any underwriters to take the risk on the dock. In securing insurance the company to which the towing contract was given, the route proposed, the crew it guaranteed to carry, the equipment, the quantity of coal, the quantity and quality of provisions and even the personnel of the executive staff were taken into consideration. In round figures the dock was insured at \$750,000 (\$60,000 less than its value) for \$50,000. The towboat company for its work is to receive \$40,000 conditional upon safe delivery of the dock at Algiers. The route to be taken is as follows: Southeast across the gulf stream from Cape Henry, a distance of about 200 miles. The stream in many places attains a speed of three knots, towing against which would be slow work, for the average speed made by the dock is only four miles an hour. Owing to its peculiar course the dock will be but little south of the starting point after having crossed the gulf stream. It will then be headed south, passing through the Bahama straits, shearing west on clearing them. The north coast of Cuba will be skirted and arrangements have been made to signal Havana to telegraph how the dock has weathered the journey. Passing Key West a straight line will be made for the Jetties. The trip by this route is 2,100 miles. If good weather ensues it is expected that the dock will reach Algiers in twenty-two days. The dock will be tested at its station by Mr. Lionel Clark of the firm of Clark & Standfield, London, its designers.

The Orion is equipped with a steam towing machine of the kind made by the American Ship Windlass Co., Providence, R. I.



# MARINE REVIEW

Devoted to the Merchant Marine, the Navy, Ship Building, and Kindred Interests.

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During the past two years the consular service of the United States has been the subject of unusual attention from a variety of sources. It has come into prominence through the logic of events. The consular office has been given dignity and importance through the amazing growth of the export trade of the United States. Then the battles of Santiago and Manila, however insignificant they may have been as purely military achievements, have had an undeniably vast political influence. The international perspective is not the same as it was in 1898. The United States looms up a truly gigantic figure. Wherefor the consular service—the branch which has most to do with the distribution of products—has forged to the front as a highly important governmental department. Has the personnel of this service progressed in proportion to its influence? We fear not. It has not been an uncommon thing in the past to send as consul to a country a man who could not even speak the language of the country to which he was accredited. Such a character is neither ornamental nor useful. Indeed nothing marks incapacity so much as inability to make one's self understood. Yet numbers of Americans have cheerfully undertaken to represent their country in various corners of the earth and have remained in blissful ignorance of the language, customs and habits of the people to the end. Moreover the habit has been practiced with some frequency of sending men abroad as representatives of the nation who would not be tolerated in office at home; and it therefore has been wittingly said that the United States government sent the undesirable among its citizens as appointees to foreign posts in order to conduce somewhat to the comfort of its domestic life. However jestingly this may have been said there is, as in all jests, the grain of truth. The government has been notoriously lax in the selection of its consuls. It has used this vitally important branch as a convenient vehicle for the payment of political debts. It were better far to pay these debts, if they must be paid, at home. No man should be sent to a consular post who is not specially fitted for his task and who cannot impress those with whom he comes in contact with the integrity of the private and national character. Indeed the work of the consul is of such a special nature that it should not be regarded as patronage. A consul, if he is a good one, should be retained in his office through succeeding administrations. What a ridiculous thing it is to remove a man right at the very moment that he becomes useful. And yet that is the very thing which has been done from time immemorial by the United States government. The consular department should be under civil service rules, and if a consul proves himself to be the very best man for the place, he should be retained for life. In this respect the English system, with its special training, is much better than the American. We do not pretend to say that the American consular service is bad. In many respects it is admirable. The American consul grips his business right in its very core—the commercial side of it. He knows that he is sent to facilitate the development of trade and he never loses sight of that fact. The system of consular reports is an excellent one, albeit the manufacturer does not utilize it as much as he might. Doubtless these reports have opened various avenues of trade and doubtless they would open more if they were studiously considered by those whom they are intended to benefit. But the service operates under adverse conditions. It is a special service and it requires special men. The time is opportune for a reform. Nay, reform is imperative. The vast export trade of the United States demands it.

The navy department has selected Lieut. Com'dr W. H. H. Southerland to succeed Capt. C. C. Todd as chief hydrographer of the navy, and orders have been issued detaching him from the command of the Dolphin. Lieut. Com'dr Southerland has come to be regarded as an expert in hydrographic work. He made the most definite survey yet had of the mouth of the Amazon, and although the work was conducted from the Dolphin with great difficulty, owing to the lack of suitable appliances and the constant heavy swell on the bar, that obstacle to navigation was successfully and accurately charted, a work of much value to commerce. Capt. Todd is to proceed to Manila to take command of the Brooklyn.

Mr. Andrew Carnegie is now en route to this country on board the steamer St. Louis. Before sailing he said that he would remain in the United States until May. He would discuss no public question save that of the Nicaragua canal, and upon that he said: "Great Britain has acted with rare good sense. The canal ought to be American, built with American money and by American workmen and American brains, and now it will be. There is no doubt Great Britain will eventually be the greatest beneficiary and will have no reason to repent the sensible course she adopted in the recent negotiations."

## IMPORTS OF MANUFACTURERS' MATERIALS.

THE QUANTITY HAS INCREASED THOUGH PRICES IN SOME INSTANCES HAVE DECREASED—ALTOGETHER THE COUNTRY IS VERY BUSY.

American manufacturers are evidently quite as busy in 1901 as they were in 1900. At least this is a reasonable conclusion from an examination of the figures of the treasury bureau of statistics which show that the total imports of manufacturers' materials in the nine months ending with September, 1901, were greater in value than those of the corresponding months of last year, although an analysis of the imports, article by article, shows that in many cases the prices per unit of quantity have decreased. This decrease in price is so strongly marked that in many cases while the figures of value show a decrease in the nine months of 1901 as compared with those of 1900, the figures of quantity for the same period show an increase. For instance, imports of India rubber, when measured by value, show a slight reduction in 1901 as compared with 1900, while the quantity imported in 1901 shows an increase of more than 5,000,000 lbs. as compared with the same months of 1900. Pig tin, used in manufacturing tin plate, shows in value a slight reduction in the imports of 1901 as compared with last year, but in quantity there is an increase of over 2,000,000 lbs. Imports of unmanufactured fibers show a decrease of more than \$2,000,000 in value as compared with those of 1900, yet the quantity shows a material increase. Taking the grand total of value of imports of raw materials for use in manufacturing, the imports in the nine months of 1901 compared with those of 1900, were: For 1901, \$221,469,984; for 1900, \$217,619,372; while in the month of September alone, the figures of the month in 1901 are \$22,725,325, against \$18,505,980 in September, 1900, a marked increase. They formed in September, 1901, 34 per cent. of the total imports, against 31 per cent. of the total imports in September, 1900.

The following statement shows the quantities of the principal articles imported into the United States for use in manufacturing during the nine months ending Sept. 30, 1900, and 1901, respectively:

Articles imported.	Nine months ending with September 1900.	1901.
Iron ore, lbs. ....	1,584,345,280	1,625,274,240
Boards, etc., ft. ....	375,103,000	388,864,000
Sulphur, crude, lbs. ....	261,842,560	267,637,440
Hides and skins, lbs. ....	234,668,656	229,751,187
Lead ore, lbs. ....	166,788,085	172,027,087
Copper ore, lbs. ....	67,399,360	147,943,040
Soda, nitrate, caustic, etc., lbs. ....	363,066,994	377,734,824
Potash, lbs. ....	108,210,849	121,871,190
Licorice root, lbs. ....	82,132,005	90,650,106
Wool, raw, lbs. ....	117,645,376	90,427,512
Logs, ft. ....	76,012,000	80,839,000
Dyewoods, lbs. ....	105,400,960	72,280,320
Tin in bars, etc., lbs. ....	54,847,417	56,908,901
Copper pigs, lbs. ....	54,443,378	56,230,624
Gums, lbs. ....	58,277,583	49,668,085
Cotton, raw, lbs. ....	45,764,589	40,608,727
India rubber, crude, lbs. ....	34,493,337	40,181,040
Cocoa, crude, lbs. ....	37,289,589	39,022,771
Mahogany, ft. ....	24,812,000	31,316,000
Leaf tobacco, lbs. ....	15,462,404	21,038,107
Silk, raw, lbs. ....	6,561,880	8,404,924
Fibers, tons ....	187,976	199,832

The following table shows the value of the principal groups of manufacturers' materials imported in the nine months of 1900 and 1901:

Articles.	1900.	1901.
Cotton, raw ....	\$ 5,689,944	\$ 5,576,278
Chemicals, drugs, etc. ....	39,479,137	40,910,420
Fibers, unmanufactured ....	21,351,842	19,259,909
Hides and skins ....	39,655,802	41,168,929
India rubber and gutta percha. ....	21,554,804	21,021,442
Silk, raw ....	26,668,772	26,910,855
Tin ....	15,281,577	14,679,768
Undressed fur skins ....	5,101,800	5,833,825
Wood, unmanufactured ....	11,078,044	12,546,169
Wool, raw ....	16,591,445	10,504,562
Unmanufactured tobacco ....	10,568,397	12,476,825

## COST OF SPANISH-AMERICAN WAR.

Probably in no other way can the cost of the Spanish-American war be computed than by comparing the cost of maintenance of the war and navy departments prior to and since the war. In 1896 the maintenance of the war department amounted to \$50,830,920 and that of the navy department to \$27,147,732. In 1897 the war department expended \$48,950,267 and the navy department \$34,561,546, and in all the preceding years the growth of the expense account had been gradual. Since 1898, however, the expenses of these two departments have been as follows:

	War Department.	Navy Department.
1898 .....	\$ 91,992,000	\$58,823,984
1899 .....	229,841,254	63,942,104
1900 .....	134,774,767	55,953,077
1901 .....	144,615,697	60,506,978
Totals .....	\$601,223,718	\$239,226,143

Taking \$50,000,000 per annum as the mean expense of each department, had the era of peace been undisturbed, which surely affords a liberal allowance for natural increase, we find that the cost of the war has been \$441,000,000. As an offset to this enormous increase of expenditure must be placed the added earning power of the nation. The war gave a great stimulus to trade. In many instances the industrial activity of the nation was doubled. Added to this also must be the natural legacy of the war—Porto Rico and the Philippines. It is too early to predict the wealth of this inheritance, for the resources of the countries have scarcely yet been touched.



## NAVAL ARCHITECTS AND MARINE ENGINEERS.

The ninth general meeting of the Society of Naval Architects and Marine Engineers will take place in New York on Thursday, Nov. 14. Through the courtesy of the president and managers of the American Society of Mechanical Engineers the meetings will again be held in the auditorium of No. 12 West Thirty-first street, the sessions continuing throughout Thursday and Friday, Nov. 14 and 15. The list of papers to be read and discussed at the meeting is as follows:

## THURSDAY, NOVEMBER 14.

1. Trial of Speed Between the Steamers City of Erie and Tashmoo, by Frank E. Kirby, Esq., member of council.
2. Effect of Variation of Dimensions on the Stresses in a Ship's Structure, by Prof. H. C. Sadler, member.
3. Graphic Calculations of the Stability of Ships, by Prof. M. H. Bauer, member.
4. Power Consumed in Propelling the Whitehead Torpedo at Various Speeds, by Frank M. Leavitt, Esq., member.
5. Balancing Marine Engines. (Prize competition paper).
6. Balancing Marine Engines. (Prize competition paper).

## FRIDAY, NOVEMBER 15.

7. A Brief Comparison of Recent Battleship Designs, by Naval Constructor H. G. Gillmor, U. S. N., member.
8. Changes in Torpedo Boat Designs, by Charles P. Wetherbee, Esq., member.
9. Late Developments in Armor and Ordnance, by J. F. Meigs, Esq., associate.
10. Recent Experiments in Attacking Armor with High Explosive Shells, by Capt. E. B. Babbitt, U. S. A.
11. Some Notes on Tidal Corrections, by E. A. Stevens, Esq., vice-president.
12. Side Launch of Torpedo Boats and Torpedo Boat Destroyers, by Assistant Naval Constructor William G. Groesbeck, U. S. N., member.

## PRODUCTION OF CUT NAILS IN 1900.

The statistics of the production of iron and steel cut nails and cut spikes in the United States in 1900 have been compiled by the American Iron & Steel Association. They do not embrace railroad and other spikes made from bar iron, wire nails of any size, or machine-made horseshoe nails. Only spikes cut from plates are included with cut nails. The total production of cut nails in 1900 was 1,573,494 kegs of 100 lbs. each, against 1,904,340 kegs in 1899, a decrease of 330,846 kegs, or over 17 per cent. In 1886 the maximum production of 8,160,973 kegs was reached. In 1900 the production of wire nails exceeded the production of cut nails by 5,660,485 kegs, in 1899 by 5,713,790 kegs, in 1898 by 5,846,254 kegs, and in 1897 by 6,890,446 kegs. Ten states made cut nails in 1900, the same number as in 1899. The following table shows the production of iron and steel cut nails by states from 1897 to 1900, in kegs of 100 lbs. The wire-nail production for the same years is added to the table:

States—Kegs.	1897.	1898.	1899.	1900.
Pennsylvania .....	1,057,964	768,171	920,133	777,611
Ohio .....	411,396	392,003	386,215	261,216
West Virginia and Indiana.....	290,203	184,942	178,006	168,469
Massachusetts and New Jersey.....	142,021	127,706	149,700	155,968
Illinois .....	34,000	87,399	255,286	193,230
Maryland, Virginia and Kentucky.....	164,465	12,000	15,000	17,000
Missouri, Colorado, Wyoming and California..	6,750			
Total cut nails .....	2,106,799	1,572,221	1,904,340	1,573,494
Total wire nails .....	8,997,245	7,418,475	7,618,130	7,233,979
Grand total .....	11,104,044	8,990,696	9,522,470	8,807,473

The Wheeling district embraces the nail mills in Ohio and Marshall counties in West Virginia and in Belmont and Jefferson counties in Ohio. There were 186,397 kegs of cut nails made in this district in 1900, against 178,006 kegs in 1899, 282,908 kegs in 1898, 292,950 kegs in 1897, 305,881 kegs in 1896, 347,742 kegs in 1895, 416,329 kegs in 1894, 1,848,116 kegs in 1887, and 1,858,551 kegs in 1886. Allegheny county, Pennsylvania, has not made any cut nails since 1890, but it is now a large producer of wire nails.

## VERDICT IN THE COBRA CASE.

The verdict of the court martial in the case of the Cobra disaster is as follows:

"The court, having taken the evidence of chief engineer J. J. G. G. Percey and that of the remainder of the survivors, and having weighed and considered the whole of the evidence before them, find that the Cobra foundered on the morning of Sept. 18 while on passage from the Tyne to Portsmouth. The court has come to the conclusion that the Cobra did not touch the ground nor meet with any obstruction, nor was her loss due to any error in navigation, but was due to structural weakness of the ship. The court also find that the Cobra was weaker than other destroyers, and in view of that fact it is to be regretted she was purchased into the service. The court further finds that no blame is attributable to Chief Engineer J. J. G. G. Percey nor the remaining survivors, and fully acquits them."

The president added that the court desired to express their opinion that the handling of the dinghy after the accident was worthy of all praise, and Torpedo Coxswain Francis Barnes deserved great credit for the way in which he acted on the trying occasion. The president then returned Mr. Percey his sword, remarking that he had great pleasure in doing so.

Some figures showing the development of Japan as a commercial nation within the past decade are interesting. The railway mileage considerably more than tripled in the ten years ending in 1899, the telegrams more than quadrupled and the telephone wires increased from 300 miles to over 18,000 miles in the same period, while the foreign commerce of the country increased to over three times what it was at the beginning of the period. There can be no doubt that Japan is the leader of Asiatic civilization, and that it has it within its power to play a weighty role in the world politics of the future.

## SHIP BUILDING AT NEWPORT NEWS.

Newport News, Va., Oct. 29.—The Morgan line steamship El Alba will be launched at the ship yard Saturday afternoon and will be christened by Miss Stella Brooks Miles of New York city, daughter of G. E. Miles, former private secretary of the late Collis P. Huntington. El Alba is the twelfth and last of the large freight steamships built here for the Morgan line's service between New York and New Orleans. The first of these magnificent ships was turned out in 1891. The first order placed with the ship yard embraced four ships of a like design. These vessels were sold to the United States government during the Spanish-American war for auxiliary cruiser service and they are still in the government service with one exception, the Yosemite (El Sud) having gone down in the Guam typhoon. A second order was placed with the ship yard for a quartet of similar ships in 1898 and shortly after four more ships were ordered. All twelve are of the same general dimensions with modern improvements embodied in each. The contract price of each was \$600,000 and it is generally admitted the Morgan line ships are the best equipped and best finished freight ships in the coastwise trade, the accommodations for officers and crew being nothing short of palatial. All of the ships were designed by Horace See of New York, consulting engineer for the Morgan and Cromwell lines.

The new steel twin-screw passenger steamer Virginia, which is building at the Trigg works in Richmond for the Chesapeake & Ohio Ry Co., will be launched Nov. 12. When completed the Virginia will ply between Newport News and Norfolk, connecting with all of the Chesapeake & Ohio trains between Newport News, Richmond and the west, and replacing the steamer Louise, which has been on this route for some years. The Virginia is 190 ft. on the load water line, 200 ft. in length over all, has a moulded beam of 32 ft., a moulded depth of 12 ft., a mean draught of 9 ft. and displacement of 675 tons. The vessel will have three decks and will be finished elegantly.

It is reported that the battleship Missouri will be ready to go overboard about the last week in December. Twelve carloads of armor for the vessel have arrived at the ship yard recently and the work will go ahead now much more rapidly than heretofore.

## SHIP YARD NOTES.

The New England Ship Building Co., Bath, Me., is building a fine wooden passenger steamer of 2,200 tons gross for the Eastern Steamship Co., of which Mr. Charles W. Morse of New York is the owner. Mr. Morse made the contract with the option of having the same company build two more steamers at the same time. The New England company is also at work on a five-master of 2,500 tons for William Palmer of Boston.

The torpedo-boat destroyer Chauncey was launched at the yards of the Neafie & Levy Ship & Engine Building Co., Philadelphia, last Saturday. The Chauncey, a sister ship of the Bainbridge, launched some time ago, and the Barry, now being built, is 245 ft. long and 23 ft. beam. She is equipped with triple-expansion engines and Thornycroft boilers and is designed to have a speed of 29 knots.

Arthur D. Story, Essex, Mass., has four vessels on the stocks—three small fishing schooners and a steamer for the government engineer at Boston. The steamer will be 91 ft. long and will be fitted with a 300 H.P. engine and Almy water-tube boilers. Bartleson & Peterson, East Boston, Mass., are putting the machinery in her.

The Lake George & Champlain Transportation Co. has awarded contracts for a new Lake George steamboat to be named the Sagamore. The hull and frame will be of steel and will be built by the Harlan & Hollingsworth Co., Wilmington, Del. The engines will be built by the W. & A. Fletcher Co., Hoboken, N. J. She will cost about \$150,000.

The Kelley & Spear Co., Bath, Me., is building a four-masted wooden schooner of 600 tons and two large coal barges for the Staples Coal Co., Taunton, Mass. The coal barges will have a carrying capacity of 4,000 tons each.

The Bath Iron Works, Bath, Me., will build the engines and the Kelley & Spear Co., Bath, Me., will build the hull of a tug for the Commercial Towboat Co. of Boston. The tug will be 102 ft. in length.

The New York Ship Building Co., Camden, N. J., has just laid the keel for its seventh vessel. It is for the American-Hawaiian Steamship Co. and is intended for the Pacific trade.

The ferry boat Port Morris for the New York & College Point Ferry Co. was launched on Wednesday from Devine Burtis' yards, South Brooklyn. The vessel is 150 ft. long.

## REAR ADMIRAL CROWNINSHIELD'S NEW BERTH.

Secretary Long has announced that Rear Admiral A. S. Crowninshield, chief of the bureau of navigation, would be detached from that position and take command of the European squadron next March, being relieved of his present duties by Admiral Henry C. Taylor. The secretary said that this plan had been arranged last April, when on the expiration of Admiral Crowninshield's four years' commission as chief of the navigation bureau, he was recommissioned for another term. The date was fixed as March 9 next, because on that day Admiral Crowninshield, who now holds the title extofficio as head of the navigation bureau, will become a rear admiral in fact through the ordinary course of retirement and promotion. It is the rule for an admiral to fly his flag over his squadron in active service before he retires and this would not be possible in Admiral Crowninshield's case were he to serve out his present commission, for he will retire early in 1905. Rear Admiral Henry C. Taylor, now a member of the general board, commanded the battleship Indiana in the Santiago campaign. He declined to be the head of the navigation bureau when Admiral Crowninshield was originally appointed.

The controversy over the award of contract for the construction of a dredge for use in the improvement of Cumberland sound has been settled in favor of Mr. George A. Gilchrist, Belfast, Me. His bid was \$150,000. Mr. Gilchrist is to supply the hull and propelling machinery. The pumps are to be purchased in the open market. The dredge is to be ready for operation by June 1 next. A companion dredge is being constructed by the Petersburg Iron Works, Petersburg, Va.



## NEW BATTLESHIPS WILL BE POWERFUL.

REAR ADMIRAL O'NEIL OUTLINES THE ARMOR AND ARMAMENT AND GENERAL FEATURES OF THOSE NOW BEING DESIGNED—EXPERIMENTS WITH SMOKELESS POWDER.

The annual report of Rear Admiral Charles O'Neil, chief of the bureau of ordnance, touched upon in the last issue of the Review, is of the most comprehensive character. The admiral estimates that he will need \$10,902,006.75 for his department during the year, of which \$2,423,000 is for new and improved batteries for the Newark, New Orleans and Albany; traveling cranes and fixtures for storehouse at navy yard, Portsmouth, N. H.; cranes and machine tools for the ordnance department, navy yard,



REAR ADMIRAL CHARLES O'NEIL.

Boston; equipment, including cranes and elevators for the new storehouse of the ordnance dock, New York; machinery and tools for the new naval gun factory at Washington, D. C.; machine tools for the ordnance department of the navy yard, Pensacola; cranes, machine tools and motive power for the ordnance workshops at the navy yard, Puget sound.

The report says that no material change has been made in the system of gun construction except that provision has been made for future guns of and above 6 in. in caliber, for an inner and outer tube or barrel, instead of a solid forging as heretofore used, in order to increase the factor of safety of the chase and muzzle of the gun. The latest types of guns are so great in weight and dimensions that it seems inadvisable to make any further increase in either respect, and increased efficiency must be looked for in the use of heavier projectiles and in the production of powder possessing higher ballistic properties. The ordnance department has already taken the initial steps to

introduce the former and hopes to be able to develop the latter.

Several 12-in. guns have been proved during the year with satisfactory results, a muzzle velocity of 2,800 foot-seconds being attained with a chamber pressure of 16 tons, the gun being designed for 17 tons pressure; weight of projectile, 850 lbs.; weight of charge of smokeless powder, 350 lbs. The breech mechanism is easily operated by one man, eight turns of the crank only being required to open or close the breech as against fifteen turns in the case of former guns of large caliber. Plans have been prepared for a new type of mount for the 12-in. 40-caliber guns, in which there are but two recoil cylinders, located under the gun, the counter-recoil springs being placed below the recoil cylinders and actuated by levers which are attached to the yoke on the breech of the gun by connecting rods. By this means the recoil and counter-recoil systems are placed entirely under the gun and will be less liable to injury than was the case in some former mounts for this caliber of gun; the parts will be more accessible and the springs, being under instead of in the recoil cylinders, as heretofore, can be more readily replaced, if necessary, and are always open to inspection. A type mount is now being made. The arrangement proposed allows of a reduction in the diameter of the barbette armor and of a reduction in the size of the port opening, both very important features.

During the year batteries were installed on board battleships Alabama, Illinois and Wisconsin. These ships, with the exception of the Illinois, have had their gun trials, which were satisfactory, and the Illinois will soon be ready for hers.

### TERMS OF ARMOR PLATE CONTRACTS ARE ADVANTAGEOUS.

Upon the subject of armor, the report says:

"Since the date of the last report all the armor manufactured under contracts made prior to that report has been delivered. This makes the total quantity of armor delivered for all vessels authorized prior to the Maine, Missouri, and Ohio, 34,971 tons, since the establishment of the armor plants in this country. The capacity of both plants is now about 7,500 tons per year of armor of the best quality, and at the instance of the department the manufacturers are making preparations to increase their output to from 10,000 to 12,000 tons per year, in order to complete deliveries under the present contracts within the times that the armor will be required for vessels now under construction and also in order to be ready to provide armor for additional vessels that might from time to time be authorized by congress.

"Under authority vested in the department by congress, contracts were signed Nov. 28, 1900, for over 37,000 tons of armor required for vessels authorized and building, as shown in the following summary, which gives the quantity required for each vessel: Maine, 2,451 tons; Missouri, 2,451 tons; Ohio, 2,451 tons; Pennsylvania, 3,332 tons; New Jersey, 3,332 tons; Georgia, 3,332 tons; Virginia, 3,332 tons; Rhode Island, 3,332 tons; West Virginia, 1,908 tons; Nebraska, 1,908 tons; California, 1,908 tons; Maryland, 1,908 tons; Colorado, 1,908 tons; South Dakota, 1,908 tons; St. Louis, 743 tons; Milwaukee, 743 tons; Charleston, 743 tons; total, 37,690 tons.

"The terms of these contracts are extremely advantageous to the government both as to quality and to price. With respect to the former, comparing the tests made in this country with reports of those made abroad, our armor would seem to be the very best that can at present be produced; and the price at which it is obtained is considerably lower than paid abroad. Deliveries amounting to nearly 2,000 tons have already been made under these contracts. During the year several tests have been made of experimental armor plates presented by inventors designed to improve the quality of armor, but in no instance has there been promise of improvement."

When the bureau first decided to establish a plant for the manufacture of smokeless powder and made the fact known to the private manufacturers the information was not particularly agreeable to them. Notwithstanding, in response to a request from the bureau of ordnance for such information as might be of use to it in carrying out its plans, the private manufacturers threw open their works and gave the department the result of their experience and the details of the various processes and appliances used by them. From that time on there has been a complete interchange of confidence and all parties have worked together to perfect the production of a nitro-cellulose powder that would be entirely satisfactory in every respect. This, as might be expected, has been attended with gratifying results, and while the manufacture of powder by the bureau is just so much out of the pockets of the private manufacturers it is of small account when compared with the present and future needs of the navy. It is decidedly in the interests of the navy department that several private manufacturers should be in a position to supply smokeless powder, and without doubt liberal patronage will always be given to those who excel in the art. Very satisfactory progress has been made during the year in producing a superior quality of smokeless powder.

It is recommended that a steel-casting plant of small capacity be added to the gun factory. Over 2,000 men are employed in the various departments of the gun factory. At the present time there is difficulty in obtaining a sufficient number of machinists.

### DOES NOT THINK MUCH OF SUBMARINE BOATS.

Rear Admiral O'Neil has never been an advocate of the submarine boat and thinks that a great deal of misleading data has been published regarding these small craft. Upon this subject he says:

"The question of submarine boats seems to have occupied public attention to a considerable degree abroad, especially in France, but their utility has yet to be proven. As scarecrows they will without doubt prove useful for a time at least. It is but a short time ago that the very name of torpedo-boat destroyers was sufficient to produce nervous prostration, but that has worn off to a large extent, and the destroyer is now relegated to its proper place as an auxiliary. The bureau believes that undue prominence is being given to submarines from a naval standpoint. If they have any value it will be as an adjunct to the system of coast defense; they can not and will not take the place of naval vessels of regular type or render a less number necessary. Unfortunately certain advocates of submarines try to show that the submarine boat is now the one and only one thing needed; that it is useless to build battleships because, from their point of view, they can be readily destroyed by submarines, apparently forgetting the fact that naval battles for supremacy will be fought on the ocean far beyond the range of submarine or other torpedo boats, and that naval prestige consists in the possession of a fleet of seagoing armored vessels of the highest type, and not in that of a number of small torpedo boats. This country might possess a great number of submarines without adding anything to its prestige as a naval power. So far as the bureau is aware no new developments have taken place within the past year calculated to inspire a conviction that submarine boats have yet passed beyond the experimental age."

### ARMOR AND ARMAMENT FOR NEW WAR SHIPS.

The admiral deals quite exhaustively with the subject of armor and armament for the new battleships and armored cruisers, the designs for which the naval board of construction is now preparing for submission to congress at its coming session. He says:

"Congress at its last session having directed the preparation of plans of battleships and armored cruisers, the department, following its usual custom, called upon the board of construction to prepare such plans. The chief of the bureau of ordnance being a member of said board, and being especially interested in the questions of armor and armament for said vessels, submitted for the consideration of the board a battery plan for the battleships, consisting of four 12-in. 40-caliber guns in pairs in turrets and twenty 7-in. 45-caliber rapid-firing guns separately mounted on pedestal mounts in casemates, being of the opinion that such a main battery supplemented by a large number of 3-in. (14-pounder) and 3-pounder guns would best fulfill the probable requirements of naval warfare by the time the proposed vessels were completed. The armor plan contemplated a complete water-line belt 8 ft. in width and 10 in. thick abreast the machinery space; 9 in. thick in wake of the magazines, tapering to 4 in. at the extremities of the vessel; upper and lower casemate armor extending from barbette to barbette of 7 in. thickness, with transverse bulkheads at the ends 7 in. in thickness; 7-in. armor protection for the 7-in. guns on the upper deck, and 2-in. armor for the 14-pounders. The 12-in. turrets to be 10 in. thick with 11-in. inclined port plates, barbettes 10 in. thick, and a heavy protective deck fore and aft.

"This scheme, with slight modifications, was adopted by three members of the board, forming a majority thereof. The vessel being designed for a speed of 19 knots and with a bunker capacity for 2,000 tons of coal, her displacement on trial—that is, with 900 tons of coal and two-thirds ammunition and stores on board—would be about 15,560 tons. The minority, consisting of two members, favored a main battery of four 12-in. guns in two turrets, twelve 8-in. guns in pairs in six turrets, four being arranged in quadrilateral and two being superposed on the 12-in. turrets, and twelve 6-in. rapid-firing guns on the gun deck in casemates. While the majority fully recognized the great strength and tactical advantages of the minority plan, it was of the opinion that a homogeneous intermediate battery of twenty 7-in. guns of independent action would prove more efficient than a mixed battery of twelve 8-in. and twelve 6-in. guns, especially as the 8-in. were disposed in six turrets, two of which were to be secured to the 12-in. turrets.

"The question of superposed turrets did not weigh much in the discussion, though the majority were of the opinion that the seven vessels already authorized with that novel feature of construction were sufficient, and that the department would not be justified in proceeding further in that direction on purely theoretical grounds. The real issue in the board was whether the 7-in. guns should take the place of 6 and 8-in. guns. The argument submitted by the chief of the bureau of ordnance was that it was advisable to increase the caliber of the intermediary guns above that of 6 in. owing to the increase that is taking place in the thickness of casemate armor and to the improved quality of armor now generally adopted. The 6-in. guns will not perforate 6 in. of Krupp armor at a distance of 3,000 yards, whereas the 7-in. gun, with a remaining velocity of 2,040 foot-seconds at that distance, will perforate about 8½ in. of armor. The 8-in.



gun, on the contrary, has a great excess of energy as against casemate armor, but not sufficient to perforate the heavy turrets or the heavy belt armor. Moreover, its rate of fire is much slower than is that of the 7-in., and made more so by being mounted alongside another gun in a turret. The 7-in. gun is essentially a rapid-firing gun, both as regards its breech mechanism and mounting, and it can be readily pointed by one man, using hand power only. The majority objected to the large number of turrets embraced in the minority plan—namely, eight—being convinced that guns so mounted lose much of their efficiency, and recent experience seems to demonstrate the fact that the larger the gun the poorer its shooting qualities. Not that guns of large caliber are in themselves less accurate than those of medium and small caliber, but because of their lack of mobility and their environment on shipboard.

"If the lessons of the naval battle of Santiago de Cuba; the Bellisle experiment off the Isle of Wight; the Scorpion experiment at Bermuda, and the recent record of target practice of the North Atlantic fleet teach anything, it is that very few hits are made with large caliber guns even under the most favorable conditions. At Santiago de Cuba out of eighty-six shots fired from 12 and 13-in. guns but three hits were recorded. In the Bellisle experiment but two hits out of fifteen shots fired from 12-in. guns were recorded. In the North Atlantic squadron out of twenty-six 13-in. shots fired none hit the target, which was of large dimensions. At the battle of Santiago de Cuba 319 8-in. projectiles were fired by the United States vessels, the number of guns engaged being presumably eighteen, the number of hits recorded being thirteen, or less than 1 per gun, the average number of shots per gun being eighteen. If the same ratio is applied to the 157 8-in. projectiles fired at the battle of Manila bay the number of hits would be 6.38, and as eight 8-in. guns were presumably engaged, the number of rounds per gun would average 19.7, and the number of hits would be less than 1 per gun.

"It is contended by some officers that if a ship can by the use of turrets preserve intact some of her heavy guns, she can continue in battle even if she is otherwise riddled with shot, provided her powers of flotation and stability be not seriously affected. The bureau is by no means so sanguine on this point, being inclined to the opinion that the demoralization of the crew and destruction of details due to the entrance of a number of shells of even medium caliber into any part of the vessel will be so great that she may be forced to withdraw even though her turret guns remain intact. Again, it should be remembered that turret armor for medium caliber guns, say those of 8-in. is not very thick—that is, not thicker than 6 in.—and is, therefore, as liable to be perforated as casemate armor of 7 in. thickness, even allowing for the advantage due to the shape of the turret. Armor in the form of turrets protects guns only and does not contribute to the protection of the hull, and hence is used at a sacrifice of weight. A considerable number of officers favor the use of the 8-in. gun in broadside rather than in turrets, but they can not be familiar with the size and weight of the latest type of gun of this caliber. They are huge weapons, and can not be effectively worked without the aid of mechanical power, with all its elaboration of details. A rapid rate of fire is often claimed for guns of and even above 8 in. in caliber, and while a fairly rapid rate can be attained on the proving ground or for a few minutes on board ship at target practice, the bureau does not believe that it can be maintained for any considerable length of time in battle.

"Having in view the foregoing facts, the bureau is of the opinion that the 7-in. gun is well suited for the intermediate caliber in the proposed battleships, and is preferable to a mixed battery of 6-in. and 8-in. guns. As regards the armored cruisers, the board was unanimous in recommending a battery of four 10-in. guns in pairs in turrets, and of sixteen 6-in. 50 caliber quick-firing guns in casemates, with a secondary battery of twenty 3-in. (14-pounders) and twelve 3-pounders. The armor protection to consist of a complete water-line belt of 6 in. thickness from barbettes to barbettes, with 3½-in. armor to the extremities; the upper and lower casemate armor and gun protection on the upper deck being 5 in. in thickness, including that for sixteen of the 14-pounders; 10-in. turrets and barbettes to be 8 in. in thickness, with 8½-in. port plates. Individual protection to be given to the 6-in. guns by closed casemates on the upper deck, and by 2½-in. splinter bulkheads on the gun deck, and transverse bulkheads separating them into small groups. The displacement of these vessels to be about 14,500 tons on trial—that is, with 900 tons of coal and two-thirds of ammunition and stores. Speed, 22 knots; bunker capacity, 2,000 tons of coal. From the above it will appear that these vessels should be able to take their place in the line of battle and compete with the majority of battleships now afloat with reasonable chance of success."

The concluding paragraph in the report is an indorsement of the card system of indexing which has been introduced into the department.

#### TRIAL OF THE RETVIZAN.

The imperial Russian battleship Retvizan, built at Cramps, was given a second trial of speed this week. Engines maintained a mean of 125 revolutions. The only accident was the giving out of a faulty tube in one of the boilers. No attempt was made during the run to attain maximum speed. During the last hour of the 12-hour run an account of the coal burned was kept and when the engines were developing 18,300 H.P. with auxiliaries the consumption amounted to 1.8 lbs. of coal an hour according to horse power. During this time the boilers steamed freely and although the blowers were running there was no air pressure shown by the gauges. The blowers assisted only by drawing the air down to the furnace level. The engines worked well and every part including the auxiliaries twirled and twisted away at their work. They were developing 15 per cent. more horse power than they were designed for.

At the completion of the 12-hour trial a trial of 24 hours at 10 knots was made to determine the coal consumption and the radius of action of the ship at that speed. The amount of coal consumed during the 24 hours showed that a radius of action of 8,800 knots was obtained by 2,000 tons of coal, her bunker capacity. Another trial lasting 2 hours to determine the most economical coal consumption was made. For this a speed of about 100 revolutions of the engines was taken, using all the boilers with slow combustion. This trial determined that the amount of coal per horse power an hour at this speed was 1.55 lbs. The engines developed 7,820 H.P. During this time the ship made 16 knots.

Percy & Small, Bath, Me., are building a five-masted schooner of 2,300 tons and a four-master of 1,550 gross tons for themselves.

#### IRON AND STEEL STRUCTURAL SHAPES.

The production of iron and steel structural shapes in the United States in 1900 has been ascertained by the American Iron & Steel Association. These statistics embrace the production of beams, beam girders, zee bars, tees, channels, angles, and other structural forms, but they do not include plate girders made from plates. Plates are provided for under other classifications, and under the general statistics of plates are included all plates cut to specifications. Nearly all the structural shapes and plates used for structural purposes are made of steel. The total production of structural shapes in 1899 was 850,376 tons, and in 1900 it was 815,161 tons. The total production of strictly structural forms in 1899 and 1900 by states was as follows:

States—Gross tons.	1899.	1900.
New England, New York, and New Jersey..	29,604	34,242
Pennsylvania .....	791,470	759,712
Kentucky and Alabama .....	304	.....
Ohio .....	20,941	12,344
Colorado and California .....	8,057	8,863
Total .....	850,376	815,161

The decreased production of structural shapes in 1900 as compared with 1899 was 35,215 gross tons, or over 4 per cent. Pennsylvania made over 93 per cent. of the total production in 1900, New Jersey over 4 per cent., and Ohio over 1.5 per cent. No other state made 1 per cent.

#### ENGLAND INTERESTED IN THE PERSONNEL BILL.

The British admiralty is understood to be taking the most lively interest in the working of the personnel bill in the American navy with the view of possible amalgamation of the line and engineer officers of the British service. Arnold Forster, secretary of the admiralty, has recently solicited special reports upon this subject. Vice Admiral Fitzgerald contributes an article to the London Times upon the subject. He thinks that the line officers should master the complicated machinery of the fighting ships else the engineers will oust them from the present predominating position.

"I am not prepared," he says, "to advocate the amalgamation of the engineers and executives in imitation of the Americans. We are certainly not ripe for it yet. Moreover, it is just as well to wait and see how it turns out with them. But if an amalgamation is to be eventually avoided it can only be by our executives becoming practical mechanics. All real work is now done by steam, electricity, and hydraulics. 'Touch the blooming button,' as Jack says, 'and let her go up.' I doubt not that he who is most expert in touching the 'blooming button' at the right moment will be the victor in future naval battles, just as the best sailors won of yore."

#### ORIGIN OF THE SCREW PROPELLER.

The London Express relates an incident which startled the ship owners and sea captains who are in the habit of frequenting the Ship and Turtle in Leadenhall street. During an animated discussion there entered what at first appeared to be a living image of one of the characters from the opera of the "Flying Dutchman." The figure which intruded so picturesquely was that of an old man, apparently about eighty years of age, but hale and hearty, with a complexion well tanned by the sun and wind. The old man wore a blue coat with large brass buttons, a double-breasted beaver waistcoat, wide pantaloons, and a hard, glazed tarpaulin hat. Entering into conversation with two or three gentlemen in the restaurant, he said that his name was Capt. Hendrik van Schuysen of Dordrecht, Holland, and that he had come over for a trip in his son's boat, as he wished to see London again before he died. Capt. van Schuysen spoke English fluently and told some remarkable stories of the sea and adventures in far countries. He had been in the seafaring profession, man and boy, for sixty-nine years, he said, and had just passed his eighty-fourth birthday.

"My father," he ended up, "was the first sailor to discover the practicability of screw propellers for steamers, instead of paddlewheels. When I was a young lad of fifteen I sailed to India with my father in an old wooden brig called the Vrow Sneider, of Amsterdam, for Calcutta. We had fearful weather off the Cape of Good Hope, and, in fact, narrowly escaped foundering. One day it was blowing a gale of wind, the brig was under her main lower topsail and foresail, and doing about two knots an hour. Suddenly a big whale crashed right into our stern. For a moment we thought all was lost; then my father gave orders to take off the after-hatch to see how much water there was in the hold. When we did so the whale's head appeared, and as fast as the water poured in through the leak in the stern the whale blew it out of the after-hatch. With the continual struggling of his tail the old brig began to go ahead, and we went into Cape Town safe and sound at the rate of 7 knots an hour.

"We returned to Amsterdam," said Capt. Schuysen solemnly, "and shortly afterwards the Archimedes and the Rattler, the first screw steamers, were built, and proved a great success."

Then, amid a silence that seemed to speak, the old man finished his grog, put his glazed hat on, and slowly waddled out into Leadenhall street, followed by the fascinated gaze of all his listeners. His story was not accompanied by an affidavit.

#### OBSTRUCTION IN ST. LAWRENCE RIVER.

The reported striking of a ship on a hitherto unknown and uncharted shoal in the St. Lawrence river between McNair island and the Canadian shore, caused the United States engineers at Buffalo to immediately start out a survey party to determine definitely as to its existence and location. This survey has now been completed, and it is found that the shoal is a rock ledge about 100 ft. long and 85 ft. wide between the 18-ft. curves, with a least depth on it of about 13½ ft. at low water. It is in the middle of the channel between McNair island and the Canadian shore, right in the track ordinarily used by deep-draught vessels navigating this river.

Major Symons, who has had charge of the matter, will recommend the removal of the shoal at the earliest possible date, and in the meantime he suggests great caution on the part of deeply-loaded vessels navigating this part of the river.



### THE BEGINNINGS OF MARINE INSURANCE.

Dr. G. Arnold Kesselbach has written an elaborate history of the development of marine insurance at Hamburg. It details the history of insurance on marine risks from its introduction into Hamburg at the end of the sixteenth century up to the present time. The very first beginning of marine insurance, however, dates from about the turn of the thirteenth century and can be traced to Italy. It was, in fact, the subject of a Florentine law passed in the year 1301, and in the archives of Genoa there are several specimens of marine insurance policies dating from the year 1347 onwards. By the fourteenth century insurance business had increased to a vast extent in Italy, and in the year 1393 one single notary of Genoa had to attest no less than eighty policies between Aug. 21 and Sept. 15. From Italy the business spread to the commercial centers of other countries. At Barcelona, in 1435, a codification of the law of marine insurance was effected, which shows that the principle of insurance must have prevailed for a long time at that port previous to 1435. The author of the work alluded to traces the progress of marine insurance from Italy to Spain, the Netherlands, Flanders, England, and Germany, and there are records of insurances on voyages from Pisa and Leghorn to London as early as the year 1442; but the earliest known date of a policy underwritten in England is 1512, in which year a ship and her cargo were insured for the voyage from Crete to England. The German Hanse towns, however, did not adopt the custom of marine insurance until a much later period, and it is easy to find a reason for this. The voyages undertaken by the Italians through the Mediterranean and the straits of Gibraltar to England or Flanders were long and wearisome in comparison with those from North Germany, besides which the ships in the Italian trade were larger and their cargoes more valuable. Even up to the beginning of the seventeenth century the craft plying between Hamburg and England were none of a greater carrying capacity than 40 or 50 ship's lasts, equal to 60 to 75 register tons of present day measurement, and those trading to the Netherlands were still smaller; whereas the ships sailing from the Mediterranean were of a capacity averaging from 100 to 200 ship's lasts, or 150 to 300 register tons. Up to nearly the end of the sixteenth century, indeed, no marine insurance business had been established in any of the Hanse towns, and the first record of the issue of a policy at Hamburg occurred in the year 1588; the insured was, however, a foreigner (a Dutchman), and out of twenty-nine underwriters who signed the policy the majority were foreigners. The ship sustained some damage on the voyage, and a dispute arose between the parties, but no legal action appears to have been taken, at any rate not at Hamburg. The second marine insurance policy issued at Hamburg was taken out by the same man (Hans de Schotte.) The ship insured was captured by an English privateer, but the underwriters refused payment because it transpired that De Schotte knew of the capture before taking out the policy. Several other instances are given of early Hamburg policies, many of them being the subjects of dispute between insurers and insured. It is interesting to notice the high rate of premiums charged in those remote times. Taking the years 1590 to 1592, for instance, premiums were high owing to the political situation. England was at war with Spain and at loggerheads with the Hanse towns, especially with Hamburg, on account of their sympathy with Spain, and English privateers captured many a Hanse vessel bound for the Iberian Peninsula. For one voyage from Hamburg to Lisbon at this time De Schotte paid a premium of 16 per cent., and for voyages from Hamburg to Leghorn premiums of 18 and 20 per cent. were paid. By about the twenty-fifth year of the seventeenth century the marine insurance business at Hamburg had developed considerably, but, as was the case at the commencement, the foreign element (mostly Dutchmen settled in that city) took the lead in it, and after these came the Portuguese Jews. As an instance of the development of the business it is stated that one underwriter (Klaus Kruse) signed ninety-eight policies in the year 1627, and thirty-nine in the second half of 1628. Insurance brokers had, even before this date, been found a convenience, if not a necessity, and as early as the year 1610 there were thirty-two sworn brokers in Hamburg. As time went on, and with the clearing of the political situation, the growth of competition, and perhaps the increasing seaworthiness of ships, premiums naturally fell to a lower level, and among those quoted from 1617 to 1628 are recorded 5 per cent. from Hamburg to Lisbon, 9 per cent. from Hamburg to Malta, 5 per cent. from Hamburg to Bayonne, 2½ per cent. from Dunkirk to Hamburg, etc. Up to nearly the end of the seventeenth century the Dutch and Portuguese underwriters were predominant in the marine insurance world at Hamburg, and then Englishmen came on the scene. An insurance exchange had by this time been established, and attempts were made in the way of combination to cope with foreign competition. Nevertheless Hamburg merchants and ship owners had frequent recourse to foreign underwriting institutions. The fact appears to have been that the Hamburg underwriters were not strong enough to undertake heavy risks. To remedy this state of things, first one and then another attempt was made in 1720 to form a joint stock insurance company, but both the schemes fell to the ground, and it was not until the year 1765 that the first insurance company started operations in Hamburg. From that time the underwriting business increased and developed rapidly, and by the year 1802 eight institutions of the kind were established, while from 1803 to 1807 no less than twenty-five other companies were founded. In 1809 twenty-eight were still existing, but after that date they disappeared one after the other until only nine were left in 1814. Subsequently the number began to grow again. In 1855 there were twenty-three; in 1865, twenty-five; in 1872, twenty-three; in 1880, fifteen; in 1885, eight; and although afterwards the number rose to eleven, there are only nine existing at the present day (1901).

Lord Strathcona, speaking of a fast Canadian service in competition with American lines, said: "I cannot but think that the Canadian port must be the one giving the shortest sea passage from land to land and I should think some point in Cape Breton is the place if it affords good harbor accommodation, and where passengers, perishable and certain kinds of fruit can be taken on board. That is the only way we can ever secure a thoroughly efficient and up-to-date service. I have always taken a very great interest in this question. I have been working at it for years and I have always maintained it was a necessary adjunct wherewith to maintain the reputation of our transcontinental route to the east. The Canadian Pacific are taking steps to accelerate the speed of their Pacific steamers and we must have a fast service on the Atlantic."

### CONNERS WANTS HIS DEPOSIT BACK.

W. J. Conners of Buffalo has written a letter to the harbor commissioners at Montreal requesting the return of the sum of \$50,000 which he deposited with them as security for carrying out his contract for the construction of terminal facilities at Windmill point. The letter was read at the last meeting of the harbor board and is as follows:

"One year ago last May I deposited with you, as chairman of the harbor board of Montreal, \$50,000; in the matter on construction, plans and specifications, \$40,000; total, \$90,000. I have done all that was in my power to succeed in financing this enterprise, and had it about financed on three different occasions, but after the people read my contract over they were not satisfied. I was also instructed by other people to start the work and they would see that it was finished; but when I called on them for the money they did not respond.

"I feel very badly to think I cannot finish my undertaking, and do not like to have any trouble with the harbor commissioners; so I think there is only one thing to do. I am willing to sign and transfer all right to any properties or lands that was given to me by the harbor commissioners, and should like to have them in return give me back my deposit of \$50,000. I do not think my request unfair, and am ready at any day to do as agreed. The loss I am at in the construction I am ready and willing to stand. In the future an elevator will be built at Windmill point, and the work I have done there will save the government from \$30,000 to \$40,000. I had undertaken the fourth time to finance this enterprise in New York when it came out in the papers that negotiations were made by the harbor board and Mr. A. B. Wolvin, whereas the harbor board is going good for his bond. The people that I was doing business with said that if the government went good for his bond, it seemed ridiculous to think that they would have to put up money for the same thing as the government or harbor board were making good for Mr. Wolvin. That was the final puncture of the scheme. Hoping that your honorable body will take action and avoid any further delay, etc."

The harbor commission adopted a resolution claiming that Mr. Conners had failed to carry out his contract and that an action had been entered in court asking for resiliation of the lease. Both the resolution and the letter were then sent to the minister of public works and minister of railways and canals for any suggestions which they may have to offer.

### CANNOT USE THE NAME BABCOCK & WILCOX.

In the suit of the Babcock & Wilcox Co. against the Joshua Hendy Machine Works a decree has been entered in the United States circuit court for the northern district of California, as follows:

"That a perpetual injunction be and it is hereby issued against the respondent, the Joshua Hendy Machine Works, and its officers, agents, attorneys, servants, clerks and employes, enjoining it and them and each of them from using the name 'Babcock & Wilcox,' either alone or combined with other word or words upon or in connection with the sale or offering for sale of any boiler or other steam apparatus not manufactured by the complainant, and from stating or representing that any boiler or other steam apparatus sold or dealt in by the respondent and not manufactured by complainant is a Babcock & Wilcox boiler, and from selling or offering for sale, or passing off any such boiler or other steam apparatus, as and for boilers or steam apparatus manufactured and sold by complainant."

This decree is of interest to every manufacturer, as it tends to sustain a property right in a trade name which has become valuable by reason of its long use in a successful business. It seems to be a matter of simple justice that a concern should be protected from infringement by others in the use of a trade name which the public has learned to regard as the designation of the source from which a manufactured article comes rather than as a description of the article.

### NEW ALGIERS FLOATING DRY DOCK.

It is said of the new Algiers floating dry dock, recently built at Sparrows Point, Md., for the United States government, that

A walk five times around it makes a mile.

It will lift the largest battleship afloat.

Its transit from Sparrows Point to Algiers, near New Orleans, represents the greatest towing effort on the seas.

It will travel 2,000 miles and stores for thirty days are carried.

The voyage will consume perhaps twenty days.

The crews of the three craft—tugs Orion and Taurus and the dock—number sixty-four men.

Into the hold has been pumped 7,516 tons of water, sufficient to fill a big ocean liner to her loading marks, but sinking the dock only 6½ ft.

The bitt to which is attached the towing lines is as big as a barrel.

The hauling chain from the tug Orion, which is equipped with a Shaw & Spiegle steam towing machine, to the dock has links 6 in. thick, every 6 ft. of which weighs 250 lbs., with a hauling power of 72 tons.

A manila hawser 600 ft. long, 10 in. thick and doubled connects the chain with the tug, where it is bound by a 3-in. wire cable.

The Orion carries 1,800 tons of coal and 300 tons of fresh water.

The route will be south of the Bahamas, skirting Cuba to avoid the Gulf Stream.

The tug Taurus will precede the Orion, and the hawsers between the two tugs will be more than a third of a mile long. They are as big around as a man's leg.

The dock contains 6,000 tons of steel and 1,000 tons of machinery. It is riveted with 1,232,800 rivets—all big ones—holding some plates ½ in. thick.

A great demonstration will be made at New Orleans upon the dock's arrival. Commercial organizations have subscribed generally for a reception, the artillery will turn out and fire a salute, and the Mississippi river steamers, dressed in bunting, will escort the dock up to the city.

No such perilous tow as this has ever been attempted. The nearest approach to it was the towing, a couple of years ago, of a dock from England to Havana. If this dock had gone adrift it would have had the whole ocean to wallow about in. But the Sparrows Point dock will always be in danger of blowing ashore in case it breaks away from its tow.

In a blow the Orion will head into the sea and simply hold on until fair weather returns. After Cape Henry is passed she will carry the dock far out to sea.



## TRADE NOTES.

Jenkins Bros., 71 John street, New York, received the following awards at the Pan-American exposition, Buffalo: Gold medal for Jenkins Bros. valves; gold medal for Jenkins '96 packing; two silver medals for rubber specialties.

The October issue of the Book of the Royal Blue, published by the passenger department of the Baltimore & Ohio Railway, Baltimore, Md., is devoted to a eulogy of the late president, William McKinley. The eulogy is in the form of a composite editorial and sermon and is excellently printed. It contains also two poems—one by Thomas Bailey Aldrich and the other by W. D. Nesbit. The book can be had for the asking.

Merchant's "Red Book" is just from the press. It describes in detail the enormous range of commodities which Merchant & Co., Inc., Philadelphia, manufacture, import and distribute. One of the most attractive features of the book is the number of photos of the company's own works. It is quite apparent that any claim which the company may make regarding the excellence of their tin and terne plates, babbitt metals, solders, star ventilators, etc., is based on an intimate knowledge of the processes of manufacture which they have adopted and perfected. The book is invaluable to manufacturers, property owners, users and jobbers of metals. It can be had upon application.

Lane & De Groot, boat builders of Brooklyn, have contracted with the Eastern Ship Building Co. for all the ships' boats that will be required for the mammoth Pacific liners that the New London plant is building for the Great Northern Steamship Co. There will be forty-four boats all told, and they are said to be the largest lifeboats ever constructed in this country. The metallic boats are extra heavy, 28 ft. long, 8 ft. 6 in. wide, and 3 ft. 7 in. deep, carrying fifty persons per boat. Each vessel will carry on davits a powerful Alco-vapor launch. Life rafts and wooden gigs will also be carried. The specifications call for the finest workmanship and best obtainable materials. The cost of the boats is said to be in the neighborhood of \$25,000.

The American Steam Gauge & Valve Mfg. Co. of Boston, one of the best-known concerns in the United States in the steam specialty line, received a gold medal at the Pan-American exposition. This company is very favorably known as manufacturers of a fine line of steam gauges, pop safety valves, Thompson indicators and engine and boiler fittings, which enjoy an extensive sale in this and other countries. Visitors to the exposition will, no doubt, remember their display, as it attracted universal attention and general approval. They announce in connection with this award that they are in position to fill, with enlarged facilities, almost an unlimited number of orders and invite correspondence from all sections. Their steam gauges and engine fittings which won for them the medal above referred to are certainly the equal of similar products from any source in the world. This company also received the highest award at the Paris exposition in 1900.

For navigation charts apply to the Marine Review.

## SURFACE CONDENSERS IN LAKE SERVICE.

In two of the fast screw passenger steamers—Iroquois and Puritan—built recently by the Craig Ship Building Co. of Toledo for lake service, it was decided, after adopting Roberts water-tube boilers, to use surface condensers. These vessels have been very successful, ranking among the fastest craft of the lakes. As few vessels in lake service have ever been fitted with surface condensers, Mr. John Craig, when in Cleveland a few days ago, was asked why they were applied to these ships. He said they were required as much on the lakes, especially in the upper lake region, as on salt water, and their absence is explained simply on the score of expense. Referring to this same question, a short time ago, Mr. E. E. Roberts of the Roberts Safety Water Tube Boiler Co. said:

"I cannot understand why it is that our friends on the lakes attempt to get along without surface condensers when no one would think of attempting to do so on the coast. I suppose many of them are not aware that salt water scale consists entirely of lime—and there is probably as much lime in Lake Superior water as there is in the water of the Atlantic ocean. Pure salt will not make scale. If you don't believe it, put it in a tea-kettle and try it. You can boil all the water away from the salt and then wash the tea-kettle out clean—without using a scraper. It is the lime in the salt water that makes the scale in a boiler, just the same as it makes the shell of the oyster and clam. Did you ever taste any salt in an oyster-shell?"

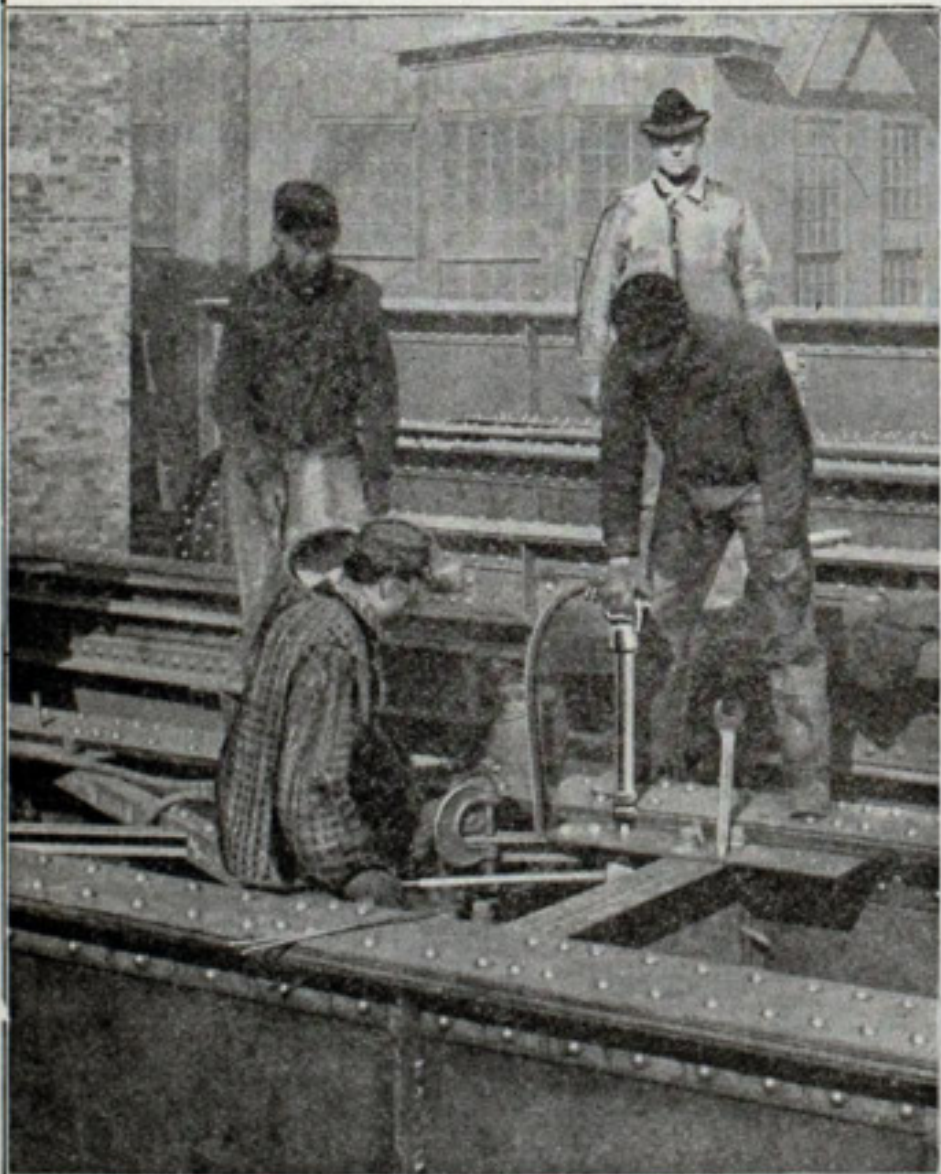
It was announced, a few days ago, that two revenue cutters, on which the Spedden Ship Building Co. of Baltimore was the lowest bidder, will have Scotch boilers. This is a mistake. The boats, one for Boston and the other for the St. Mary's river, are to be of 96 and 110 ft. length, respectively, and will each have a Roberts boiler with 70 sq. ft. of grate surface and 2,800 sq. ft. of heating surface. The contract for these boilers was signed direct with the treasury department. It is understood that each vessel will have a surface condenser and an evaporator.

The Roberts company keeps inspected material in stock for marine boilers. During the slow season in the summer they build a great variety of sizes of marine boilers which they guarantee to meet United States inspection for 250 lbs. working pressure. Their business has increased so much lately that they are now putting up a storage building, about 140 by 150 ft., in which to store these boilers. They will then be able to meet any emergency in answer to an order by telegraph.

Henry Konitzky, 1911 Diamond street, Philadelphia, has severed connection with the Cramp works, but does not intend to give up the pursuit of ship building. He has had thirty years' experience and will probably soon be associated with some of the other ship building concerns of the country.

The Lake Erie Boiler Compound Co. of Buffalo, N. Y., has been incorporated with \$75,000 capital for the purpose of manufacturing a boiler compound for the prevention of the formation of scale in boilers. James Powers, C. P. Barnwell and E. C. Schwingel are the incorporators.

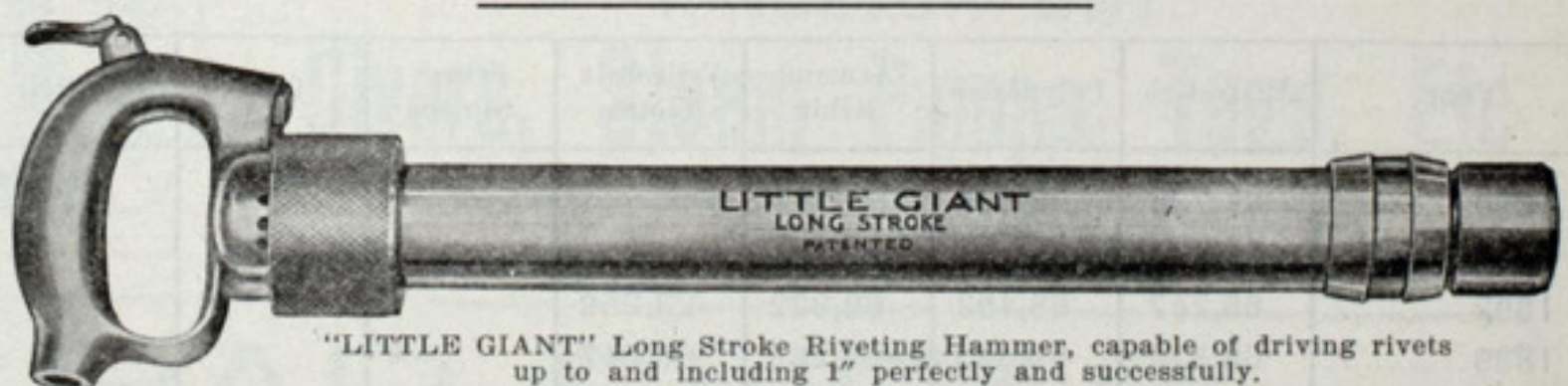
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## FIRES ON SHIPBOARD.

"Why water is not always used in extinguishing fire in a ship's hold is clear," says Fire and Water. "While it can be used to great advantage in the case of fires in the open air, if it should be employed to put out a big fire in the hold of a vessel the sudden burst of steam so formed would be the parent of disastrous results. M. Diolis, a French maritime engineer, has recently suggested a new method of discovering and extinguishing a fire on shipboard, especially that arising from spontaneous combustion in the cargo. His method seems too expensive and elaborate for general application but it is worthy of note. To give warning of fire, or of a rise of temperature that may lead to it, he would distribute through the cargo vertical metallic tubes. Into these tubes, from time to time, thermometers could be lowered to ascertain the temperature. His next step would be to place in the midst of the cargo a large cask containing lime and communicating by a small tube with the bridge. In case of fire in the hull sulphuric acid is poured into the tube, and a violent production of carbonic acid gas takes place, which smothers all combustion."

## CHICAGO NAUTICAL SCHOOL.

The Chicago Nautical School has opened its sixth annual season with exceedingly bright prospects for a large attendance immediately after the close of navigation. Many of the lake men who have attended in former years announce their intention of returning to take the salt-water course and a larger number of mates and others are preparing to take up the course to advance themselves for next season. The school is now incorporated and diplomas will be given this year to all who pass a satisfactory final examination. The naval militia association of Chicago has announced that it will give a series of prizes to those making the highest averages in that department of the school, and the naval militia men are accordingly forming a class by themselves to attend the school for a special course.

## GOLD MEDAL FOR MORISON SUSPENSION FURNACES.

A gold medal has been awarded the Continental Iron Works of New York, borough of Brooklyn, for the Morison suspension boiler furnaces exhibited at the Pan-American exposition. These furnaces are in great favor for land and marine boilers. Their form of construction offers the greatest possible resistance to distortion or collapse and a freedom from leakage not to be obtained in furnaces which consist of sectional flanged and riveted cylinders, with reinforcing rings interposed between the flanges, or any other method. The Continental Iron Works are the sole manufacturers in this country of the Morison suspension furnaces.

Excursion rates to Florida via Baltimore & Ohio R. R. and Washington, D. C., passing through the beautiful cities of the south. Stop over privilege allowed on all round trip tickets. Two fast trains leave Cleveland daily at 3:00 and 11:20 p. m. Call at city ticket office, 241 Superior street.

## ITEMS OF GENERAL INTEREST.

The King Alfred, the largest cruiser in the world, was successfully launched at Barrow-in-Furness on Monday. The cruiser cost £1,011,759. She will have a speed of 23 knots.

The Kaiser Wilhelm der Grosse of the North German Lloyd line, which arrived this week at Plymouth, broke her own record to that port from Sandy Hook by 1 hour and 25 minutes. Her time was 5 days and 10 hours and her average hourly speed was 22.88 knots. Her best daily run was 539 miles. She had moderate sea and weather all the way across.

Short Bros., Sunderland, England, have just launched the Shimosa for the New York & Oriental Steamship Co., Ltd., of which Barber & Co., Produce Exchange building, New York, are the managers. The Shimosa is a sister ship of the Satsuma and is of 7,200 tons dead weight carrying capacity. She will ply between New York, Singapore, Shanghai, Yokohama and Vladivostock and will receive her first cargo in New York in December.

The Hamburg-American line will, it is announced, construct several steamships that are to surpass everything afloat in the novelty line. They will be 12,000-ton ships of the Pennsylvania class but will be designed for a speed of 16 knots. The vessels will have only a few upper berths and will be fitted out with grill rooms, gymnasiums, and a play room for children. Each will have twin screws and an indicated horse power of 8,000. Unlike the Pennsylvania class, the ships are meant for the transportation of passengers rather than for immense cargoes of freight.

The French chamber of deputies has begun the discussion of the ministerial project to revive the French merchant marine. The bill provides that any iron or steel vessel, exceeding 100 tons gross tonnage, engaged in international trade and flying the French flag, shall receive an annual subsidy in proportion to her tonnage until she is twenty years old. A large subsidy is accorded to vessels fulfilling similar conditions built in France and under 15 years old. Admiral Rieunier (Republican) criticized the bill as being ineffective and suggested a tax on foreign flags entering French ports.

Oriental advices received this week contain important news of steamship extensions by Japanese companies. The Toyo Kaisen Kaisha, operating the Nippon Maru, American Maru, and Hong Kong Maru between Hong Kong and Yokohama and San Francisco, has decided to construct two Pacific liners of at least 10,000 registered tonnage in order to properly compete with the Pacific Mail Steamship Co., which has recently added two such steamers to its fleet in the Siberia and Korea. The new Japanese steamers will be built in Japan. The company will not issue new stock but will instead raise the money from reserve funds and by the issue of debentures. At its annual meeting on Oct. 1, the company paid a 12 per cent. dividend from profits earned by its steamer service to San Francisco.

# BELLEVILLE GENERATORS

Grand Prix 1889  
Originated 1849

Hors Concours 1900  
Latest Improvements 1896

Number of Nautical Miles made each year by Steamships of the Messageries Maritimes Co., Provided with Belleville Generators—Since their Adoption in the Service.

Year.	Australien	Polynésien	Armand Béhic	Ville de la Ciotat	Ernest Simons	Chili	Cordillère	Laos	Indus	Tonkin	Annam	Atlantique
1890.....	67,728	2,460										
1891.....	68,247	68,331	204									
1892.....	68,247	68,403	69,822	23,259								
1893.....	68,379	68,343	68,286	68,247								
1894.....	68,439	68,367	68,574	68,439	37,701							
1895.....	68,673	68,766	68,739	68,808	40,887	28,713						
1896.....	69,534	92,718	69,696	69,549	62,205	63,153	40,716					
1897.....	68,250	69,606	92,736	69,555	62,235	76,110	63,357	43,146				
1898.....	70,938	69,534	69,552	69,597	62,526	63,240	63,240	62,553	63,954	22,707		
1899.....	69,534	69,615	67,431	90,405	60,246	62,778	62,868	52,344	54,855	44,007	22,884	
1900.....	69,534	67,494	69,744	69,564	61,719	62,382	62,502	51,471	53,373	62,016	63,066	52,140
Total.....	757,503	713,637	644,784	597,423	387,519	356,376	292,683	209,514	172,182	128,730	85,950	52,140

ATELIERS ET CHANTIERS DE L'ERMITAGE, À ST. DENIS (SEINE), FRANCE.

WORKS AND YARDS OF L'ERMITAGE AT ST. DENIS (SEINE), FRANCE.

TELEGRAPHIC ADDRESS: BELLEVILLE, SAINT-DENIS-SUR-SEINE.



**HOLMER & GOODENOUGH.**

Messrs. Carl L. Holmer and Walter Goodenough, well known to the designers of ships in the principal works of the country, have opened offices in Battery Park building, New York, for the practice of naval architecture and marine engineering. Brief reference to the experience of these gentlemen will probably not be out of place in view of their new undertaking.

Mr. Holmer, having received a technical education in his native country, Sweden, went to Great Britain in 1877, where he remained twelve years working in the ship yards and drawing offices of such firms as Charles Mitchell & Co., New Castle-on-Tyne (now incorporated as Sir William Armstrong, Whitworth & Co.), Harland & Wolff, the Fairfield Ship Building & Engineering Co., and Robert Napier & Sons. After six years on the Clyde, he came in 1889 to the United States for a lengthy holiday and found both climatic conditions and the general outlook so much to his taste that he decided on remaining. For four years he was employed in ship yards on the Atlantic coast, and for five years on the great lakes. In 1898 he returned to Europe, having been offered an advantageous position as chief constructor of Bergens Mek., Varksted, Bergen, Norway. The excessively damp climate of that gulf stream visited coast proved, however, extremely detrimental to his health, and after a year's stay he came back to the United States, where, after a year and a half at the Bath Iron Works, he became associated with Mr. Goodenough in a consulting business in New York city.

Mr. Goodenough's experience, after completing the mechanical engineering course at the Michigan state college, was obtained in the draughting rooms of the Cleveland Ship Building Co., Chicago Ship Building Co., Bath Iron Works, Fore River Ship & Engine Co., Maryland Steel Co., at which last place he was chief engine draughtsman. He has also been employed as engineer on the steamers North West of the Northern Steamship Co., Manola of the Minnesota Steamship Co. on the great lakes, and on the steamer Allegheny of the Atlas line of mail steamers, running to the West Indies, his experience thus covering a very wide portion of the field of marine engineering.

It is more than probable that life boats on the several large ocean-going steamers being built at the works of the New York Ship Building Co., Camden, N. J., and the Maryland Steel Co., Sparrows Point, Md., for the Atlantic Transport line, will be equipped with detaching apparatus of the kind made by the Standard Automatic Releasing Hook Co., 17 State street, New York. Capt. Luckhurst, marine superintendent of the line, is in favor of the use of the Standard device.

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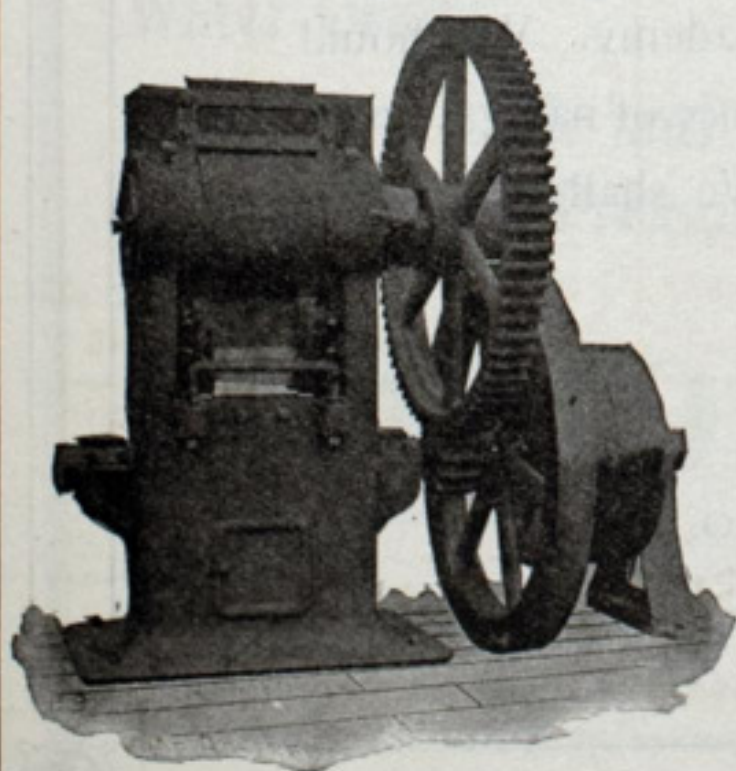
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But changes, wonderful to contemplate, have marked the last half century. The name of the great revolution was steam. Through its agency seamanship lost its old command. It became subordinate to the science of navigation. All existing volumes upon seamanship speedily became obsolete. But yesterday of unquestioned authority, today they are merely junk. Such is the moving panorama of the world's progress that its views appear, like opportunity, but once upon the scene and are gone. How appropriate, therefore, is its title "Modern Seamanship." It has to do with seamanship as it exists today, when every sea is charted, when even the rise and fall of the tides in every part of the world is computed by machinery, when hurricanes can hurl their awful force against the ocean liner—not to destroy but merely to check. "The hurricane reached its maximum at twelve and the Kronprinz Wilhelm checked down"—the dispatches will say. Checked down to what? To 19 knots. Twenty-five years ago there wasn't a steamship afloat that could make 19 knots in the smoothest sea that ever was sailed. This is the seamanship the book deals with. It embraces all, the old and the new, but its great virtue is that it is distinctly modern.

We are in the business of handling books, but when the printer sent us this product of his handiwork, we complimented him. It is a large book but it is superb to the least detail of its 428 pages, to which must be added 136 of the finest and clearest plates we have ever seen. No book has received more favorable notices. Even the daily press, usually as dumb as oysters when a technical volume appears, have devoted columns to it. It has been adopted as a text book at the United States Naval Academy. We should think that every person interested in modern seamanship, in the science of navigation, in the building, equipping and managing of a ship would want it. We shall be glad to send it to anyone. THE PRICE IS \$6.

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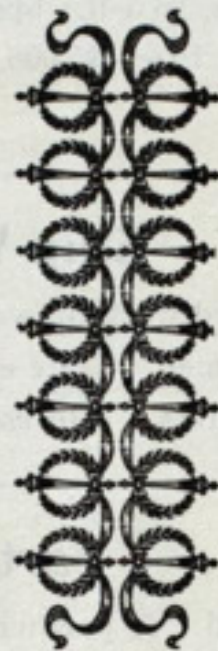
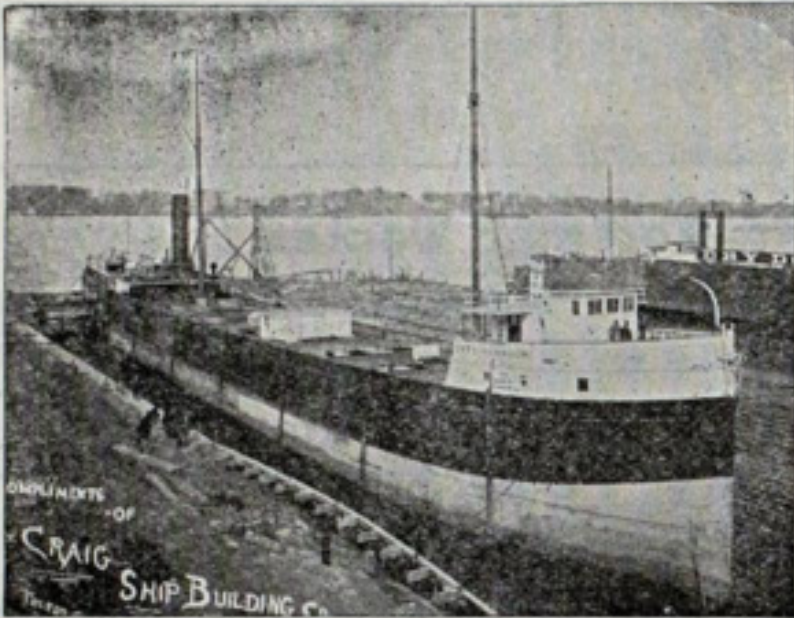
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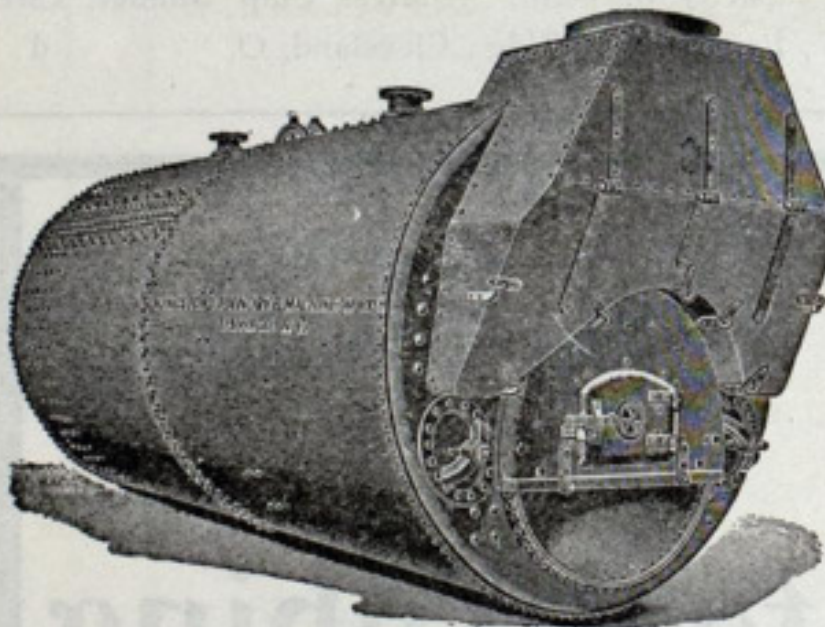
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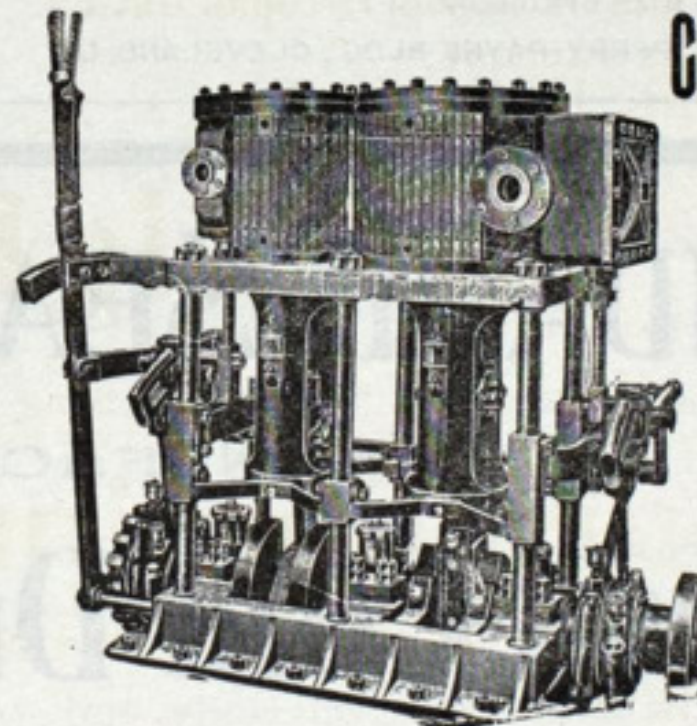
A SPECIALTY.



### Marine Boilers.

Centrifugal Pumping Machinery for all Purposes.

Kingsford Foundry and Machine Works,  
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### Chas. P. Willard & Co.

F. C. WALTER, Manager.

45-49 S. Canal St., CHICAGO.

BUILDERS OF

Marine Engines and Boilers,  
Paddle Wheel Engines,  
Boat Machinery,  
High Pressure, Compound and  
Triple Expansion Engines,  
Yachts and Launches.

WRITE FOR CATALOGUE.

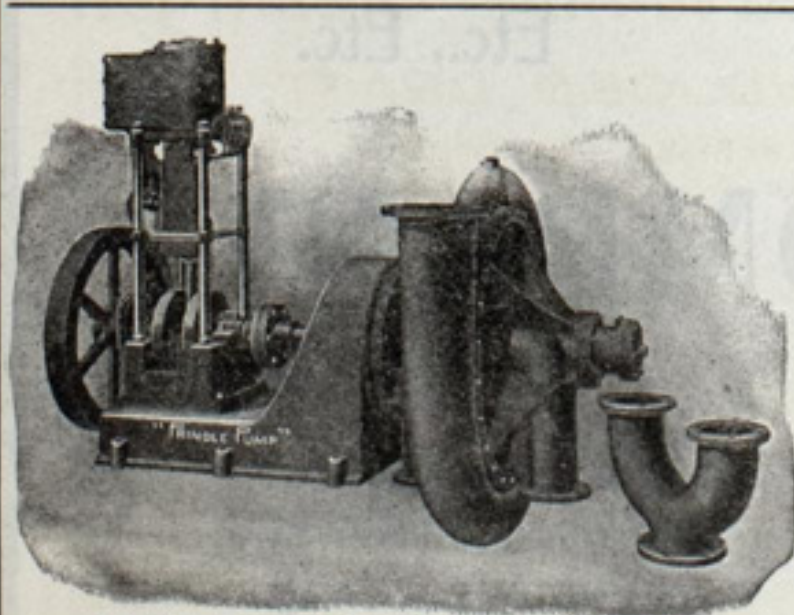
**R. D. WOOD & CO.,**

400 CHESTNUT ST.,  
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## CENTRIFUGAL PUMPS

DIRECT-CONNECTED TO

STEAM ENGINE OR ELECTRIC MOTOR.

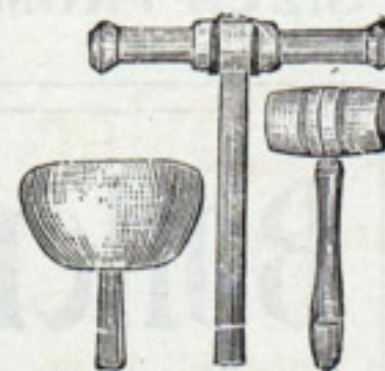


10 IN. PUMP AND 8 X 8 IN. ENGINE.

UNEQUALLED FOR

### MARINE SERVICE.

Circulating Water for  
Condensers,  
Bilge Water Drainage,  
Dry Dock Service,  
Dredging, Wrecking, &c.



### WE ARE THE INVENTORS OF THE CAULKING MALLETS

NOW USED IN ALL THE SHIP YARDS OF THE WORLD.  
Specialties: Boiler Makers' Mallets, Stone Cutters' Mallets, Hawsing Beetles, and all kinds of Mallets.

Illustrated Catalogue and Price List upon application.

**N. Y. Mallet & Handle Works,**  
Established 1845.

454 E. Houston Street, NEW YORK, U. S. A.

## NAVIGATION SIMPLIFIED.

Not an elaborate technical work—just an assistant for the seaman and a book of valuable plain instruction for beginners.

Contains problems required in examinations that are given by government inspectors to masters and mates of sea-going vessels.

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CLOTH BINDING, \$1.25.

PAPER BINDING, \$1.00.

THE MARINE REVIEW PUB. CO., PERRY-PAYNE BLDG., CLEVELAND, O



## Absolute extinction of fires in holds or bunkers of ships no matter what the cargo.

Machine installed weighs 3800 lbs.

THE CLAYTON FIRE EXTINGUISHING AND DISINFECTING COMPANY  
11 BROADWAY, NEW YORK.



### Pan-American Route

between CLEVELAND and BUFFALO.

STEAMERS CITY OF BUFFALO AND CITY OF ERIE.

Finest and fastest passenger steamers in the United States.

TIME CARD—DAILY—APRIL 15 TO DEC. 1.

Leave Cleveland 8 p. m. Arrive Buffalo 6.30 a. m.

Leave Buffalo 8 p. m. Arrive Cleveland 6.30 a. m.

ADDITIONAL SERVICE DURING JULY AND AUGUST.

Connections made at Buffalo with trains for all Eastern and Canadian points; at Cleveland for Detroit and all points West and Southwest.

SPECIAL LOW RATES CLEVELAND TO BUFFALO AND NIAGARA FALLS EVERY SATURDAY NIGHT, ALSO BUFFALO TO CLEVELAND.

W. F. HERMAN, General Passenger Agent, Cleveland, O.

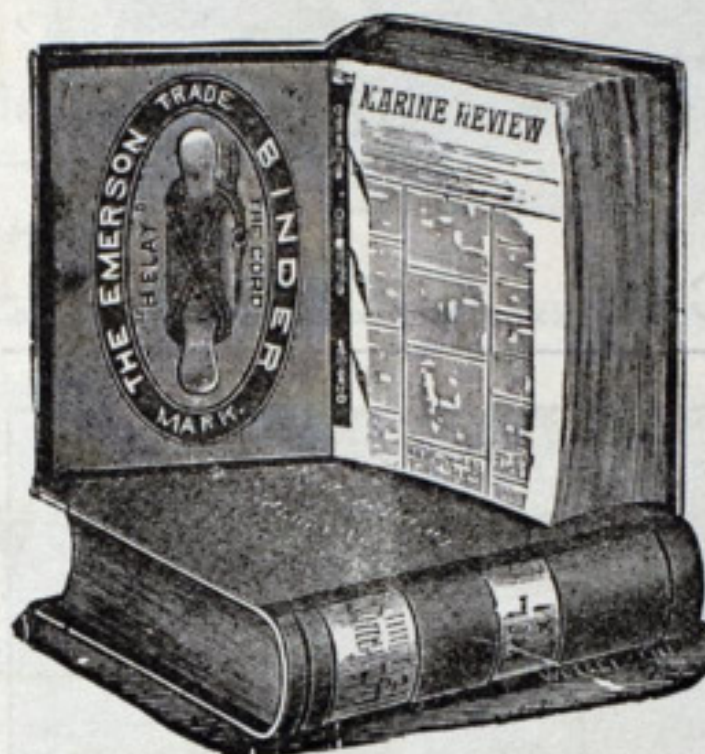
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MANUFACTURERS OF

Oakum, Plumbers' Spun and Marine Oakum and Spun Cotton.

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ONE OF THESE BINDERS

that will hold 52  
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**MARINE REVIEW,**

Will be mailed to  
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receipt of \$1.

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Perry-Payne Bldg.,  
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## Pintsch Gas Lighted Buoys

Adopted by the English, German, French, Russian, Italian, and United States Light House Departments, for Channel and Harbor Lighting; over 1000 gas buoys and gas beacons in service.

### Burn Continuously

from 80 to 365 days and nights without attention,  
and can be seen a distance of six miles.

Brilliant and Steady Illumination.

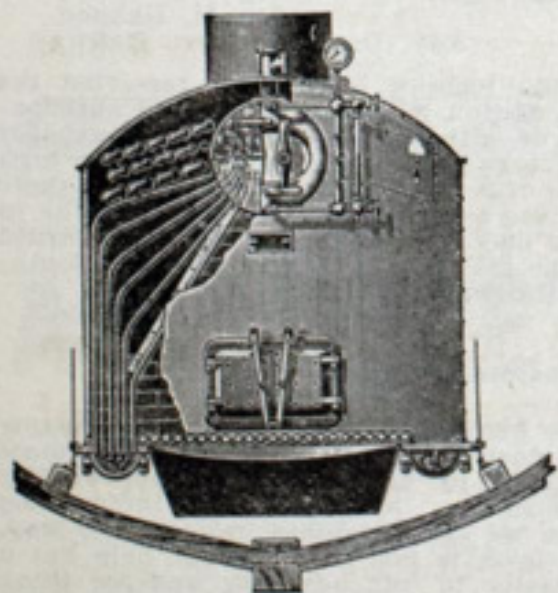
Controlled by the **SAFETY CAR HEATING AND LIGHTING CO.,**

Economical and Reliable in Operation.

160 Broadway, New York City.

### SEABURY'S Safety Water Tube Boiler

For all types of Steam Vessels and  
Stationary Plants.



Reliable, Safe, Durable, Compact, Light Weight, Economical, Easily Managed.

Tubes may be readily cleaned, internally or externally

### Marine Engines,

STEAM and SAIL  
YACHTS,  
THE ONLY NAPHTHA LAUNCH.

Gas Engine & Power Co. and  
Charles L. Seabury & Co. Consolidated.  
MORRIS HEIGHTS, NEW YORK CITY.

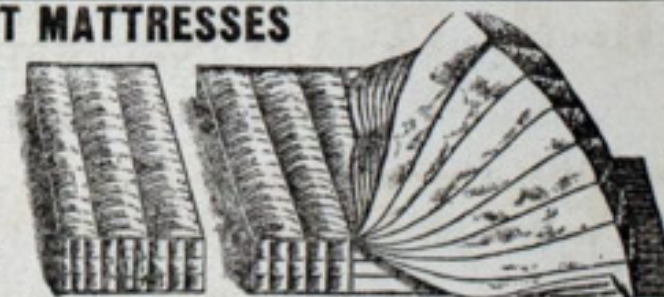
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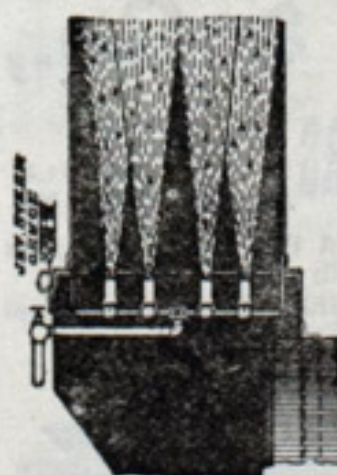
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### The Improved Annular Steam Jet.

FOR INDUCED DRAFT.



POWERFUL. ECONOMICAL.  
15 to 25% increase in power.

Cut on right shows section of Jet Castings which are attached to spider in stack, as shown in cut on left.

Standard Jet gives between  $\frac{3}{4}$ " and  $1\frac{1}{8}$ " draft in stack.

With Hoods gives between 1" and  $1\frac{1}{2}$ " draft in stack.

With Reducer and Dampers gives between  $1\frac{3}{4}$ " and  $2\frac{1}{4}$ " draft in stack

REQUIRES NO ATTENTION.

ALWAYS READY FOR USE.

67 JETS IN USE.

**H. BLOOMSBURG & Co.,**

112 35th St.,

Newport News, Va.



# The W. L. SCOTT COMPANY, ERIE, PA.

WHOLESALE DEALER IN

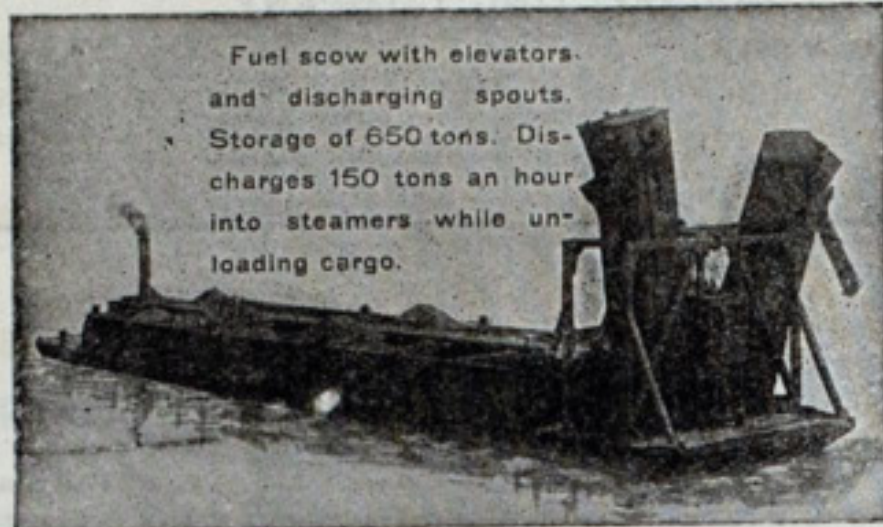
SHAMOKIN  
ANTHRACITE  
WILKESBARRE**COALS**YOUGHIOGHENY  
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MANSFIELD

VESSEL FUELING A SPECIALTY By STEAM LIGHTER or Car Dump at all hours. Electric Light.

Main Office, Scott Block, Long Distance Telephone No. 440.  
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## Steamboat Fuel at Ashtabula. LARGE SUPPLIES OF BEST QUALITY

### Lighter

Carrying  
Different  
Grades  
at all  
Times.M. A. HANNA & CO., Miners and Shippers.  
Main Office, Perry-Payne Bldg., Cleveland

## THE Swain Wrecking Co.

The TUG FAVORITE  
STATIONED AT CHEBOYGAN, MICH.  
WITH COMPLETE WRECKING OUTFIT  
IN CHARGE OF  
CAPT. MARTIN SWAIN  
THE  
CANADIAN WRECKER SAGINAW  
STATIONED AT DETROIT, MICH.  
CHARLES US TO WRECK IN CANADIAN WATERS  
STEAM PUMPS AND SUB-MARINE  
WORK IN CHARGE OF  
JOHN S. QUINN  
ADDRESS ALL communications to  
A. A. & B. W. PARKER.  
OFFICE  
15 WATER ST. WEST  
DETROIT, MICH.

4 STEAM PUMPS, 10 JACKS, 3 HAWSEERS.  
1 COAL AND OIL PUMP  
3-12 INCH ROTARY  
1-14 INCH WORTHINGTON  
DIVING RIGS  
AND  
DIVERS  
ABOARD  
AT ALL TIMES

NOVEMBER.						
S	M	T	W	T	F	S
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

10-100 TON JACKS  
1-12 INCH HAWSEER  
1-10  
1-9  
Telegraph  
CAPT. M. SWAIN  
CHEBOYGAN, MICH.

A. A. & B. W. PARKER, SUCCESSORS TO PARKER & MILLEN,  
DETROIT, MICH.

## Pickands, Mather & Co.,

### FUEL LIGHTERS

AT BUFFALO, ERIE, ASHTABULA AND CLEVELAND.  
AT DETROIT, MICH., A FUEL DOCK equipped with Shute capacity of 600 Tons.  
Best Quality PITTSBURGH COAL furnished at any time during Day or Night.

Western Reserve Building, CLEVELAND, O.

## American Newspaper Directory.

Tells the circulations of all American newspapers. Revised, corrected and reissued every three months. Sixteen hundred pages: Price Five Dollars a volume or \$20 a year.

### BUFFALO.

We should hardly know how to get along without the American Newspaper Directory. We regard it by all odds the most complete and reliable guide that the advertiser can make use of; in fact, we use no other.

Buffalo, N. Y., July 24, 1901.

R. V. Pierce, M. D.,  
President World's Dis. Med. Ass'n.

### VERMONT.

The American Newspaper Directory stands, as it has always stood, the first and best of newspaper directories—the only one which cannot be ignored, the only one which every advertiser must have. No other can take its place; no other is needed—Joseph Auld, in the Burlington (Vt.) News of July 3, 1896.

### ADVISOR.

The Advisor accepts the American Newspaper Directory as the standard in newspaper ratings. The obstacles which obstruct its efforts to get true and reliable information are many.

The directory question is one which interests every publisher in the country—nay, the entire world. But in the United States directories are becoming altogether too numerous. In this, as with other books of reference, it is necessary to have one which may be relied on as being an authority on the matter of newspaper circulations. There can be no question about the fact that at this time, as for many years past, the American Newspaper Directory is that authority. The Advisor is not paid to make this announcement. It makes the statement in the interests of advertisers and publishers because it is true. One thing the advertiser is almost cock-sure of when he refers to the American Newspaper Directory is that the circulation figures he sees therein are not overstated to any great extent. In most other directories they are. Only the publisher himself is to be blamed for not securing a proper rating in that publication, and every advertiser of consequence knows it. Thus the publisher who refuses to furnish a statement places himself under a reasonable suspicion.—The Advisor for June.

New York, June, 1901.

### CHICAGO.

Messrs. Geo. P. Rowell & Co.'s American Newspaper Directory has long since earned the reputation of being the best of its character. It contains the results of patient, expensive and systematic effort to secure all attainable information of interest concerning American newspapers. The work has been honestly done. This will not be questioned by any unprejudiced examiner. The most important question is circulation. In attempting to give this information the editor of the Directory encounters his most difficult work. It is the aim and necessity of the Directory to give the truth. The American Newspaper Directory is to-day the dependence and guide, in a greater or less degree, of every large advertiser in the country.—Chicago (Ill.) Daily News.

### BATES.

The American Newspaper Directory is the only reliable guide for the advertiser. No man who advertises can afford to do without it.

What Bradstreet and Dun are to the mercantile world the American Newspaper Directory is to the world of periodical publications.

A new advertiser will get from the American Newspaper Directory a better idea of the greatness of his country, and the tremendous possibilities in newspaper advertising, than from any other source.

If an advertiser spends only \$100 a year he should have the American Newspaper Directory. For his business may grow and his right expenditure of his money become increasingly important. The time to learn how to spend \$10,000 is before it is spent, otherwise the spending may be disastrous.

Many times the best paper in town costs the advertiser no more than the poorest. The American Newspaper Directory tells which is which.

The paper that was the leader in its town five years ago may lag behind today. Even one year may witness astonishing changes. If you are spending money for publicity it is vastly important that you should know where to get the most of it for the price. The American Newspaper Directory gives not only the present circulation rating of every paper in America, but shows their history by quoting past ratings.

The book costs five dollars a copy, and a single reference to it may readily save or make many times its cost.

All newspaper directories but one are erroneously optimistic about circulations. The American Newspaper Directory may occasionally err on the other side, but that makes it all the safer for the advertiser.

My advertising experience began in 1885, and one of the first things I did was to buy a copy of the American Newspaper Directory.

For sixteen years Rowell's "The Ameri-

Five Dollars a Volume or \$20 per annum. Sent, carriage paid, on receipt of price. Address

GEORGE P. ROWELL &amp; CO., Publishers American Newspaper Directory, 10 Spruce St., New York.

can Newspaper Directory" has had a place of honor and usefulness on my desk.

Many a publisher is ready to prove by other directories that "Rowell's is wrong," but few indeed can be induced to prove it by opening their circulation books to the advertiser.

Among publishers who are not willing that their real circulations be known it is the best hated book in print. The moral is not far to find.

Charles Austin Bates.

New York, June 24, 1901.

### PABST.

If the improvement of the American Newspaper Directory continues in the future as it has during the past twenty years I do not think I shall live long enough to see any other directory take its place. There will, however, be the usual crop of directories, just as every other good thing is imitated. Your long years of experience in dealing with evasive circulation reports have most admirably fitted you for placing a proper valuation upon such statements. Advertisers have come to know that the Rowell estimates are nearer the proper figure than can otherwise be obtained. The American Newspaper Directory is therefore indispensable in every well regulated advertising department. Lines are being more tightly drawn every day; it is difficult to collect for twenty thousand when you print only eight. If the advertiser were buying barley he would not accept three pecks for a bushel, although the quality might at all times be open for discussion.

The American Newspaper Directory is the guide and companion of the advertising man, and it is to the interests of all concerned to help perfect it, support it and hurrah for it.

Pabst Brewing Co.,  
J. R. Kathrens, Adv. Mgr.  
Milwaukee, Wis., June 7, 1901.

### SAPOLIO.

A growing need created it—the advertising agency system. One of the earliest and most successful workers, Geo. P. Rowell, is still in the field. He originated methods. Others followed. A first early step in advance was his publication of a list of all the papers—the American Newspaper Directory. He has never ceased to love it, and labor for it. Soon, out of the gross stupidity of imitation, it became a rule that every agency down to those of Oshkosh or Oklahoma must issue its own directory. An awful waste, for not more than one out of ten was worth shelf room. If the National Association of Advertising Agents could agree long enough to buy Mr. Rowell's Directory, publish it officially and drop all the others, it would accomplish something.

Artemas Ward,  
Advertising Manager for Sapolio.  
—In Fame, March, 1901.

### WASHINGTON.

Every page of the American Newspaper Directory breathes the desire of its publishers that it shall be absolutely correct in every statement it makes.

Truly yours, Frank Roe Batcheld,  
Clerk of the Committee on Banking and Currency, House of Representatives, U. S. Washington, D. C., Jan. 17, 1899.

### SOUTHERN.

We subscribe to and pay cash for the American Newspaper Directory, and find it of great value in our advertising department. We have 6,892 miles of railway, extending from Washington, D. C., all over the South, and in advertising this system we use more than 1,000 publications, and in selecting this list we find that we get a correct idea of circulation from this Directory that can not be obtained from any other similar publication. We receive other newspaper directories gratis; but the fact that we pay cash for this one in addition shows that we can not place the same dependence upon the "free list."

We thoroughly appreciate the careful manner in which this Directory is compiled.

Washington, D. C., Sept. 13, 1900.

Jos. H. Hannen,  
Adv. Dept. Southern Railway.

I am looking forward to receiving the new edition with a great deal of anticipation as, although the American Newspaper Directory seemed to have reached a high state of perfection several years ago, there is always something new and of value in each succeeding edition. It is regarded as the standard authority with the Southern Railway.

S. H. Hardwick,  
General Passenger Agent.  
Washington, D. C., May 21, 1901.

### BALTIMORE.

We have used the American Newspaper Directory for many years and find it more valuable to us than any other similar publication. Much of the information given we cannot obtain in any other way. The book is not only a great help but a necessity to our business, and we think its way of stating circulations is the ideal one.

A. C. Meyer & Co.,  
Prop'rs of Dr. Bull's Cough Syrup, etc.  
Baltimore, July 31, 1901.



# CASTNER, CURRAN & BULLITT, SOLE AGENTS FOR POCAHONTAS SMOKELESS SEMI-BITUMINOUS COAL

THE BEST STEAM COAL IN THE WORLD.

Officially endorsed by Great Britain and United States. Standard Fuel of United States Navy.  
Used exclusively on Cunard, White Star and other Transatlantic Lines.

Main Office, 328 Chestnut Street - - PHILADELPHIA PA.

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Old Colony Building, Chicago, Ills.

70 Kilby Street, Boston, Mass.

Terry Building, Roanoke, Virginia.

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# PITTSBURG COAL CO.

Steamboat Fueling Facilities at various points on the Great Lakes:

Cleveland Harbor { 4 Car Dumpers. 3 Lighters.	Fairport Harbor { 1 Car Dumper. 1 Lighter.	Ashtabula Harbor { 1 Car Dumper. 1 Lighter.	Erie Harbor { 1 Car Dumper. Fuel Pockets.
Detroit River Branch { Docks and Pockets at Sandwich and Amherstburg.		Sault River Branches { Dock and Pockets at Detour. Dock and Pockets at Sault Ste. Marie. (The Port Royal Dock Co.)	

WE FURNISH ONLY THE BEST GRADE OF **PITTSBURG and YOUGHIOGHENY COAL.**

General Office, Lake Department, Perry-Payne Building, Cleveland, O.

## STEAMBOAT FUEL AT CHICAGO.



**Youghioghenny and  
Lehigh Coal Co.**

J. T. CONNERY, Manager. ARCHIE J. HITCHCOCK, Dock Sup't.

**FUEL DOCKS:** { No. 1, Michigan Slip & Basin. 'Phone Main 1650.  
No. 2, N. Halsted St. Bridge. 'Phone Main 1649.  
No. 3, Foot South Water St. and Illinois Central  
Slip C. 'Phone Main 1679.

**FUEL LIGHTER:** Equipped with 125 2-ton Buckets for Fueling Anywhere in Harbor.

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Long Distance Telephone, Main 1650. 110 LA SALLE STREET.

## The Rochester & Pittsburgh Coal & Iron Co. REYNOLDSVILLE COAL.

STEAMBOAT FUEL DOCK—Blackwell Canal at Michigan St. Bridge. 1400 feet of dock frontage. Hulett Car Dumping Machine. Steam Fuel Scow of 550 tons capacity. Boats coaled day or night.

OFFICE: 684-88 Ellicott Square, BUFFALO, N. Y.  
TELEPHONE, Seneca 1154.

E. McQ. DUTHIE,  
Cargo and Fuel Agent.



# STANLEY B. SMITH & CO.

DETROIT, MICH.

SHIPPERS  
OF

# COAL

BY  
RAIL AND LAKE

OPERATING

## SMITH'S COAL DOCK, Detroit River.

## A COMPLETE SET OF CHARTS OF THE GREAT LAKES

ELEVEN IN ALL

SENT TO ANY ADDRESS, CARRIAGE PREPAID, FOR

== \$5.45. ==

LAKE SUPERIOR.	DETROIT RIVER.
LAKE MICHIGAN.	ST. CLAIR RIVER.
LAKE HURON.	LAKE ST. CLAIR.
LAKE ERIE.	STRAITS OF MACKINAC.
ST. MARY'S RIVER IN THREE PARTS.	

THE MARINE REVIEW PUB. CO., 418-419 Perry-Payne Building, CLEVELAND, O.



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CALVIN CARR, JOHN F. WEDOW,  
H. B. EINHART, ALFRED MITCHELL,  
R. J. DUNHAM. Long Distance Telephone, Harrison 1194.

**MITCHELL & CO.**

Vessel and Insurance Agents,  
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Office Telephone M 767.  
Residence, John Mitchell, Doan 341. CLEVELAND, O.  
John F. Wedow, Doan 141 J. Alfred Mitchell, Doan 218.

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Long Distance Telephone, CHICAGO.  
Harrison 1586.

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TRANSPORTATION. Board of Trade,  
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Office Telephone 338. CLEVELAND, O.  
Residence Telephone 2938.

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VESSEL AGENTS.  
MARINE INSURANCE.  
2 & 4 Sherman Street, CHICAGO, ILL.  
Tel. Harrison 2847.

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Long Distance Telephone, Harrison, 1339. CHICAGO.

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**DRAKE & MAYTHAM,**

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G. W. MAYTHAM.  
Telephone Seneca 1660. BUFFALO, N. Y.

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Office Telephone, Main 2453.  
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For Selling, Chartering and Building all classes Steam Vessels. 66-68 Broad St.,  
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WILLIAM E. STOWE. 204 Dearborn Street,  
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Suite 806 Marquette Building. CHICAGO  
Telephone Central 1225.

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Offices, 702 Western Reserve Building,  
CLEVELAND, O.

**White, Johnson, McCaslin & Cannon,**

ATTORNEYS AT LAW and  
PROCTORS IN ADMIRALTY,  
Williamson Building, CLEVELAND, O.

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Counselors at Law in Patent Causes  
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**HERBERT WRIGHT & CO.,**

1011-1015  
THE WILLIAMSON BUILDING,  
CLEVELAND, O.  
TELEPHONE, MAIN 2754.

Every possible facility for conducting a  
brokerage business in

**STOCKS, BONDS, GRAIN, ETC.**

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Ship Surveyor.  
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Prepares designs or working drawings and specifications for all classes of vessels and superintends construction and repairs. Surveys damaged property and estimates cost of repairs. Arbitrator and court expert. Vessels designed—Twin S. S. Virginia, U. S. S. Frolic, formerly Steam Yacht Comanche, Twin S. S. North West and North Land, I. W. Nicholas, and many others, including Fire Boats, Tugs, Barges, etc.

COMPLETE PLANS FURNISHED FOR  
STEEL COMPOSITE OR WOODEN VESSELS.

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CARL L. HOLMER. WALTER GOODENOUGH.

**HOLMER & GOODENOUGH,**

Naval Architects and  
Marine Engineers,  
508 Battery Park Building, NEW YORK CITY.

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GENERAL MARINE AGENT,  
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SPECIAL ATTENTION GIVEN TO MARINE INVESTMENTS  
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CORRESPONDENCE SOLICITED.

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Inspectors of Shipbuilding Materials and Machinery.  
Inspectors located at all mills, Physical and Chemical  
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**ROBERT W. HUNT & CO.**

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Inspectors of Shipbuilding Material and Machinery. In-  
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**HORACE SEE,**

CONSULTING ENGINEER  
AND NAVAL ARCHITECT,  
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**FANS FOR VENTILATION, EXHAUST, ETC.**  
American Blower Co.....Detroit.  
Boston Blower Co.....Hyde Park, Mass.  
Buffalo Forge Co.....Buffalo.  
Sturtevant, B. F. Co.....Boston.

**FEED WATER PURIFIERS AND HEATERS.**  
Learnmonth, Robert.....Buffalo.  
Reilly Repair & Supply Co., James.....New York.  
Reynolds, H. J.....Cleveland.  
Smith, W. Blackburn.....Perth Amboy, N. J.

**FIRE EXTINGUISHING APPARATUS.**  
Clayton Fire Extinguishing & Disinfecting Co.....New York.

**FIXTURES FOR LAMPS, OIL AND ELECTRIC.**  
Page Bros. & Co.....Boston.  
Porter's Sons' Co., Wm.....New York.

**FOG SIGNALS.**  
Colt Co., J. B.....New York.  
Hamilton-Foster Fog Signal Co.....New York.

**FORGES.**  
Buffalo Forge Co.....Buffalo.  
Sturtevant, B. F. Co.....Boston.

**FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.**  
Cleveland City Forge & Iron Co.....Cleveland.  
Fore River Ship & Engine Co.....Quincy, Mass.



## BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

## FURNACES FOR BOILERS.

Continental Iron Works.....New York.

## FUELING COMPANIES AND COAL DEALERS.

Castner, Curran & Bullitt (Pocahontas).....Philadelphia.  
 Hanna, M. A. & Co.....Cleveland.  
 Pickands, Mather & Co.....Cleveland.  
 Pittsburg Coal Co.....Cleveland.  
 Rochester & Pittsburgh Coal & Iron Co.....Buffalo.  
 Scott Co., The W. L.....Erie, Pa.  
 Smith, Stanley B. & Co.....Detroit.  
 Youghiogheny & Lehigh Coal Co.....Chicago.

## GAS BUOYS.

Safety Car Heating &amp; Lighting Co.....New York.

## GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.  
 Lake Shore Engine Works.....Marquette, Mich.  
 Olds Motor Works.....Detroit.

## GAGES, STEAM AND VACUUM.

American Steam Gauge Co.....Boston.  
 Ashton Valve Co.....Boston.  
 Crosby Steam Gage & Valve Co.....Boston.

## GRAPHITE.

Dixon Crucible Co., Joseph.....Jersey City, N. J.

## GRAPHITE BUSHINGS AND BEARINGS.

Graphite Lubricating Co.....Bound Brook, N. J.

## HAMMERS, PNEUMATIC.

Standard Pneumatic Tool Co.....Chicago.

## HAMMERS, STEAM.

Bement, Miles & Co.....Philadelphia.  
 Chase Machine Co.....Cleveland.  
 Niles Tool Works Co.....Hamilton, O.

## HATCH GEARS.

"Long Arm" System Co.....Cleveland.

## HAWSERS, WIRE.

American Steel &amp; Wire Co.....Chicago.

## HEATING APPARATUS.

Sturtevant, B. F. Co.....Boston.

## HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.  
 Brown Hoisting Machinery Co., Incorporated.....Cleveland.  
 Chase Machine Co.....Cleveland.  
 Elwell-Parker Electric Co.....Cleveland.  
 General Electric Co.....New York.  
 Hodge, S. F. & Co.....Detroit.  
 Hyde Windlass Co.....Bath, Me.  
 Lidgerwood Mfg. Co.....New York.  
 Marine Iron Co.....Bay City.  
 Westinghouse Electric & Mfg. Co.....Pittsburg.

## HOSE FOR PNEUMATIC TOOLS.

Sayen &amp; Schultz.....Philadelphia.

## HYDRAULIC MACHINERY.

Bement, Miles & Co.....Philadelphia.  
 Watson-Stillman Co., The.....New York.  
 Wood & Co., R. D.....Philadelphia.

## ICE MACHINERY.

Roelker, H. B.....New York.

## INDICATORS FOR STEAM ENGINES.

American Steam Gauge Co.....Boston.  
 Ashton Valve Co.....Boston.  
 Crosby Steam Gage & Valve Co.....Boston.

## INJECTORS.

Crane Co.....Chicago.  
 Jenkins Bros.....New York.

## INSURANCE, MARINE.

Brown & Co.....Buffalo.  
 Chamberlain & Co., S. R.....Chicago.  
 Drake & Maytham.....Buffalo.  
 Elphicke, C. W. & Co.....Chicago.  
 Helm, D. T. & Co.....Duluth, Minn.  
 Hutchinson & Co.....Cleveland.  
 Keith, J. G. & Co.....Chicago.  
 La Salle & Co.....Duluth.  
 Mitchell & Co.....Cleveland.  
 Osborn, F. H. & Co.....Chicago.  
 Parker, A. A. & W. B.....Detroit.  
 Peck, Chas. E. & W. F.....New York and Chicago.  
 Richardson, W. C.....Cleveland.  
 Sullivan, D. & Co.....Chicago.  
 Tandy, Frank N.....Boston.

## IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland.  
 Hanna, M. A. & Co.....Cleveland.  
 Pickands, Mather & Co.....Cleveland.

## IRON OR STEEL STAYBOLTS, HOLLOW OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

## LATHES OF ALL KINDS.

Niles Tool Works Co.....Hamilton, O.  
 Pratt & Whitney Co.....Hartford, Conn.

## LAUNCHES—NAPHTHA, ELECTRIC.

Gas Engine &amp; Power Co.....New York.

## LIFE PRESERVERS, LIFE BOATS, BUOYS, RAFTS, ETC.

Armstrong Cork Co.....Pittsburg.  
 Drein, Thos. & Son.....Wilmington, Del.  
 Kahnweiler's Sons, D.....New York.  
 Lane & DeGroot.....Brooklyn.

## LIGHTS, SIDE AND SIGNAL.

Page Bros. & Co.....Boston.  
 Porter's Sons' Co., Wm.....New York.

## LOGS.

Walker & Son, Thomas.....Birmingham, Eng.  
 Also Ship Chandlers.

## MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

## MACHINE TOOLS.

Bement, Miles & Co.....Philadelphia.  
 Niles Tool Works Co.....Hamilton, O.  
 Pond Machine Tool Co.....Plainfield, N. J.  
 Pratt & Whitney Co.....Hartford, Conn.

## MALLET FOR CAULKERS, BOILER MAKERS, ETC.

N. Y. Mallet &amp; Handle Works.....New York.

## MARINE RAILWAYS, BUILDERS OF

Crandall &amp; Son, H. I.....East Boston, Mass.

## MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W.....New York.  
 Lein, Irvine & Co.....New York.

## MECHANICAL DRAFT FOR BOILERS.

American Blower Co.....Detroit.  
 American Ship Building Co.....Cleveland.  
 Boston Blower Co.....Hyde Park, Mass.  
 Bloomsburg & Co., H.....Newport News, Va.  
 Buffalo Forge Co.....Buffalo.  
 Detroit Shipbuilding Co.....Detroit.  
 Sturtevant, B. F. Co.....Boston.

## METALLIC PACKING.

Katzenstein, L. & Co.....New York.  
 U. S. Metallic Packing Co.....Philadelphia.

## METALS FOR BEARINGS.

Cramp, Wm. & Sons.....Philadelphia.  
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.

## METAL POLISH.

Bertram's Oil Polish Co.....Boston, Mass.

## MILLING MACHINES OF ALL KINDS.

Bement, Miles & Co.....Philadelphia.  
 Niles Tool Works Co.....Hamilton, O.

## NAUTICAL INSTRUMENTS.

Bliss, John & Co.....New York.  
 Ritchie, E. S. & Sons.....Brookline, Mass.

## NAUTICAL SCHOOL.

Chicago Nautical School.....Chicago.

## NAVAL ARCHITECTS.

Gaskin, Edward.....Buffalo.  
 Holmer & Goodenough.....New York.  
 See, Horace.....New York.  
 Wood, W. J.....Chicago.

## OAKUM.

Stratford Oakum Co., Geo.....Jersey City, N. J.

## OILS AND LUBRICANTS.

Dixon Crucible Co., Joseph.....Jersey City, N. J.  
 Standard Oil Co.....Cleveland.

## PACKING.

Crane Co.....Chicago.  
 Garlock Packing Co.....Palmyra, N. Y.  
 Jenkins Bros.....New York.  
 Katzenstein, L. & Co.....New York.  
 Sayen & Schultz.....Philadelphia.  
 U. S. Metallic Packing Co.....Philadelphia.

## PAINTS.

Baker, Howard H. & Co.....Buffalo.  
 Toch Bros.....New York.  
 Upson-Walton Co.....Cleveland.

## PATENT ATTORNEYS.

Thurston &amp; Bates.....Cleveland.

## PATTERN SHOP MACHINERY.

Atlantic Works, Inc.....Philadelphia.

## PIPE THREADING AND CUTTING MACHINES.

Merrell Mfg. Co.....Toledo, O.

## PIPE, WROUGHT IRON.

Bourne-Fuller Co.....Cleveland.  
 Crane Co.....Chicago.

## PLANERS OF ALL KINDS.

Bement, Miles & Co.....Philadelphia.  
 Niles Tool Works Co.....Hamilton, O.

## PLANING MILL MACHINERY.

Atlantic Works, Inc.....Philadelphia.

## PLATE BENDING AND PLANING MACHINES.

Bement, Miles & Co.....Philadelphia.  
 Cleveland Punch & Shear Works Co.....Cleveland.  
 Niles Tool Works Co.....Hamilton, O.  
 Wood & Co., R. D.....Philadelphia.

## PLUMBING, MARINE.

Reilly Repair & Supply Co., James.....New York.  
 Sands, Alfred B. & Son.....New York.

## PNEUMATIC TOOLS.

Standard Pneumatic Tool Co.....Chicago.

## POLISH FOR METALS.

Bertram's Oil Polish Co.....Boston.

## PRESSURE REGULATORS.

D'Este Co., Julian.....Boston.

## PROPELLER WHEELS.

American Ship Building Co.....Cleveland.  
 Atlantic Works.....East Boston, Mass.  
 Bath Iron Works, Ltd.....Bath, Me.  
 Cramp, Wm. & Sons.....Philadelphia.  
 Detroit Shipbuilding Co.....Detroit.  
 Farrar & Trefts.....Buffalo.  
 Fore River Ship & Engine Co.....Quincy, Mass.  
 Hardy, John B.....Tacoma, Wash.

Hyde Windlass Co.....Bath, Me.  
 Harlan & Hollingsworth Co.....Wilmington, Del.  
 Hodge, S. F. & Co.....Detroit.  
 Jenks Ship Building Co.....Port Huron, Mich.  
 Lockwood Mfg. Co.....East Boston, Mass.  
 MacKinnon Mfg. Co.....Bay City, Mich.  
 Maryland Steel Co.....Sparrow's Point, Md.  
 Moran Bros. Co.....Seattle, Wash.  
 Neale & Levy Ship & Engine Bldg. Co.....Philadelphia.  
 Newport News Ship Building Co.....Newport News, Va.  
 Nixon, Lewis.....Elizabeth, N. J.  
 Phosphor Bronze Smelting Co., Ltd.....Philadelphia.  
 Pusey & Jones Co.....Wilmington, Del.  
 Risdon Iron Works.....San Francisco.  
 Roelker, H. B.....New York.  
 Sheriffs Mfg. Co.....Milwaukee.  
 Trigg, Wm. R. Co.....Richmond, Va.  
 Trout, H. G.....Buffalo.

## PROJECTORS, ELECTRIC.

Badt-Goltz Engineering Co.....Chicago.  
 Elwell-Parker Electric Co.....Cleveland.  
 General Electric Co.....Schenectady, N. Y.  
 Rushmore Dynamo Works.....Jersey City, N. J.  
 Seidler-Miner Electric Co.....Detroit.  
 Westinghouse Electric & Mfg. Co.....Pittsburg.

## PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co.....New York.  
 Kingsford Foundry & Machine Works.....Oswego, N. Y.  
 Wood, R. D. & Co.....Philadelphia.  
 Worthington, Henry R.....New York.

## PUNCHES, RIVETERS, SHEARS.

Bement, Miles & Co.....Philadelphia.  
 Cleveland Punch & Shear Works Co.....Cleveland.  
 Niles Tool Works Co.....Hamilton, O.  
 Wood, R. D. & Co.....Philadelphia.

## REFRIGERATING MACHINERY.

Roelker, H. B.....New York.

## REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register.....Cleveland.

## RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co.....New York.

## RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co.....Cleveland.  
 Champion Rivet Co.....Cleveland.

## R. I. W. DAMP RESISTING PAINT.

Toch Bros.....New York.

## RIGGING ROPE (WIRE).

American Steel &amp; Wire Co.....Chicago.

## RUBBER GOODS.

Hale Rubber Co., Alfred.....So. Boston, Mass.

## RUBBER INSULATED WIRES.

Roebling's Sons, John A.....New York and Cleveland.  
 American Steel & Wire Co.....Chicago.

## SAFETY VALVES.

American Steam Gauge Co.....Boston.  
 Ashton Valve Co.....Boston.  
 Crosby Steam Gage & Valve Co.....Boston.

## SAIL MAKERS.

Baker, Howard H. & Co.....Buffalo.  
 Upson-Walton Co.....Cleveland.  
 Wilson & Silsby.....Boston.

## SALVAGE COMPANIES.

See wrecking companies.

## SEAM COMPOSITION AND ELASTIC SEAM PAINT.

Cole &amp; Kuhls.....Brooklyn.

## SEARCH LIGHTS.

Badt-Goltz Engineering Co.....Chicago.  
 Elwell-Parker Electric Co.....Cleveland.  
 General Electric Co.....Schenectady, N. Y.  
 Rushmore Dynamo Works.....Jersey City, N. J.  
 Seidler-Miner Electric Co.....Detroit.  
 Westinghouse Electric & Mfg. Co.....Pittsburg.

## SHAPERS.

Bement, Miles & Co.....Philadelphia.  
 Niles Tool Works Co.....Hamilton, O.  
 Pratt & Whitney Co.....Hartford, Conn.

## SHEARS.

See punches, riveters and shears.

## SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co.....Cleveland.

## SHIP BUILDERS.

American Ship Building Co.....Cleveland.  
 Atlantic Works.....East Boston, Mass.  
 Bath Iron Works, Ltd.....Bath, Me.  
 Buffalo Dry Dock Co.....Buffalo.  
 Cramp, Wm. & Sons.....Philadelphia.  
 Craig Ship Building Co.....Toledo, O.  
 Chicago Ship Building Co.....Chicago.  
 Detroit Shipbuilding Co.....Detroit.  
 Fore River Ship & Engine Co.....Quincy, Mass.  
 Hardy, John B.....Tacoma, Wash.  
 Harlan & Hollingsworth Co.....Wilmington, Del.  
 Jenks Ship Building Co.....Port Huron, Mich.  
 Lockwood Mfg. Co.....East Boston, Mass.  
 Maryland Steel Co.....Sparrow's Point, Md.  
 Moran Bros. Co.....Seattle, Wash.  
 Neale & Levy Ship & Engine Bldg. Co.....Philadelphia.  
 Newport News Ship Building Co.....Newport News, Va.  
 Nixon, Lewis.....Elizabeth, N. J.  
 Pusey & Jones Co.....Wilmington, Del.  
 Risdon Iron Works.....San Francisco.  
 Roach's Ship Yard.....Chester, Pa.  
 Trigg, Wm. R. Co.....Richmond, Va.  
 Willard, Chas. P. & Co.....Chicago.

## SHIP CHANDLERS.

Baker, Howard H. & Co.....Buffalo.  
 Moran Bros. Co.....Seattle, Wash.  
 Reilly Repair & Supply Co., James.....New York.  
 Upson-Walton Co.....Cleveland.



## BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

## SOUNDING APPARATUS.

Farr, C. W. .... Chicago.

## SPARS—LARGE SIZES.

Moran Bros. Co. .... Seattle, Wash.

## STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co. .... Cuyahoga Falls, O.

## STEAM VESSEL FOR SALE.

Holmes, Samuel. .... New York.

## STEAMSHIP LINES, PASS. AND FREIGHT.

Algoma Central Co. .... Sault Ste. Marie, Ont.  
 American Line. .... New York.  
 Cleveland & Buffalo Transit Co. .... Cleveland.  
 Dominion Line. .... Boston.  
 Erie & Western Trans. Co. .... Buffalo.  
 International Nav. Co. .... Philadelphia.  
 Red Star Line. .... New York.

## STEEL CASTINGS.

Seaboard Steel Casting Co. .... Chester, Pa.

## STEERING APPARATUS.

American Ship Building Co. .... Cleveland.  
 Chase Machine Co. .... Cleveland.  
 Detroit Shipbuilding Co. .... Detroit.  
 Electro-Dynamic Co. .... Philadelphia.  
 Hyde Windlass Co. .... Bath, Me.  
 Jenks Ship Building Co. .... Port Huron, Mich.  
 Queen City Engineering Co. .... Buffalo.  
 Sheriffs Mfg. Co. .... Milwaukee.

## STOCKS, BONDS, SECURITIES.

Wright, Herbert &amp; Co. .... Cleveland.

## STOCKLESS ANCHORS.

Baldt Anchor Co. .... Chester, Pa.  
 International Anchor Co. .... Cleveland.

## SUBMARINE DIVING APPARATUS.

Hale Rubber Co., Alfred. .... So. Boston, Mass.  
 Schrader's Son, A. .... New York.

## SURVEYORS, MARINE.

Holmer & Goodenough. .... New York  
 Gaskin, Edward. .... Buffalo.  
 See, Horace. .... New York.  
 Wood, W. J. .... Chicago.

## TELEGRAPH—DECK AND ENGINE ROOM.

Cory, Chas. &amp; Son. .... New York.

## TESTS OF MATERIAL.

Hunt, Robert W. & Co. .... Chicago.  
 Pittsburgh Testing Laboratory, Ltd. .... Pittsburgh.

## THERMOMETERS FOR MECHANICAL PURPOSES.

Helios-Upton Co. .... Peabody, Mass.

## TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Bement, Miles & Co. .... Philadelphia.  
 Cleveland Punch & Shear Works Co. .... Cleveland.  
 New Doty Mfg. Co. .... Janesville, Wis.  
 Niles Tool Works Co. .... Hamilton, O.  
 Pond Machine Tool Co. .... Plainfield, N. J.  
 Pratt & Whitney Co. .... Hartford, Conn.  
 Standard Pneumatic Tool Co. .... Chicago.  
 Watson-Stillman Co. .... New York.  
 Wood, R. D. & Co. .... Philadelphia.

## TOOLS, WOOD WORKING.

Atlantic Works, Inc. .... Philadelphia.

## TOPOPHONE—Prevents disasters in fogs.

Colt Co. J. B. .... New York.

## TOWING MACHINES.

American Ship Windlass Co. .... Providence, R. I.  
 Chase Machine Co. .... Cleveland.

## TOWING COMPANIES.

Donnelly Salvage & Wrecking Co. .... Kingston, Ont.  
 Midland Towing & Wrecking Co., Ltd. .... Midland, Ont.  
 Swain Wrecking Co. .... Detroit.

## TRAPS, STEAM.

D'Este Co., Julian. .... Boston.  
 Haines Co., Wm. S. .... Philadelphia.

## TRUCKS.

Boston &amp; Lockport Block Co. .... Boston.

## TUBING, SEAMLESS.

Benedict & Burnham Mfg. Co. .... Waterbury, Conn.  
 Standard Seamless Tube Co. .... Pittsburgh.

## VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .... Boston.  
 Ashton Valve Co. .... Boston.  
 Crane Co. .... Chicago.  
 Crosby Steam Gauge & Valve Co. .... Boston.  
 D'Este Co., Julian. .... Boston.  
 Jenkins Bros. .... New York.  
 Wood & Co., R. D. .... Philadelphia.

## VARNISH PAINT.

Mair, John &amp; Son. .... Philadelphia.

## VESSEL AND FREIGHT AGENTS.

Boland, John J. .... Buffalo.  
 Brown & Co. .... Buffalo.  
 Chamberlain & Co., S. R. .... Chicago.  
 Drake & Maytham. .... Buffalo.  
 Elphicke, C. W. & Co. .... Chicago.

Hall & Root. .... Buffalo.  
 Helm, D. T. & Co. .... Duluth, Minn.  
 Holmes, Samuel. .... New York.  
 Hutchinson & Co. .... Cleveland.  
 Keith, J. G. & Co. .... Chicago.  
 Kennedy Hunter & Co. .... Antwerp.  
 Mitchell & Co. .... Cleveland.  
 Richardson, W. C. .... Cleveland.  
 Sullivan, D. & Co. .... Chicago.  
 Tandy, Frank N. .... Boston.

## VENTILATING APPARATUS FOR SHIPS.

American Blower Co. .... Detroit.  
 Boston Blower Co. .... Hyde Park, Mass.  
 Buffalo Forge Co. .... Buffalo.  
 Sturtevant, B. F. Co. .... Boston.

## WIRE ROPE AND WIRE ROPE FITTINGS.

American Steel & Wire Co. .... Chicago.  
 Baker, H. H. & Co. .... New York and Cleveland.  
 Roebling's Sons, John A. .... New York and Cleveland.  
 Upson-Walton Co. .... Cleveland.

## WHISTLES, STEAM.

American Steam Gauge Co. .... Boston.  
 Ashton Valve Co. .... Boston.  
 Crosby Steam Gauge & Valve Co. .... Boston.

## WINDLASSES.

American Ship Windlass Co. .... Providence, R. I.  
 American Ship Building Co. .... Cleveland.  
 Hyde Windlass Co. .... Bath, Me.  
 Jenks Ship Building Co. .... Port Huron, Mich.

## WINCHES.

American Ship Windlass Co. .... Providence, R. I.  
 Hyde Windlass Co. .... Bath, Me.

## WOOD WORKING MACHINERY.

Atlantic Works, Inc. .... Philadelphia.

## WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co. .... Kingston, Ont.  
 Midland Towing & Wrecking Co., Ltd. .... Midland, Ont.  
 Swain Wrecking Co. .... Detroit.

## YACHT SAILS, FITTINGS, HARDWARE, ETC.

Wilson &amp; Silsby. .... Boston.

## YACHT AND BOAT BUILDERS.

Drein, Thos. & Son. .... Wilmington, Del.  
 Gas Engine & Power Co. .... New York.  
 Lane & DeGroot. .... Brooklyn.  
 Willard, Chas. P. & Co. .... Chicago.

## YAWLS.

Drein, Thos. & Son. .... Wilmington, Del.  
 Lane & DeGroot. .... Brooklyn.

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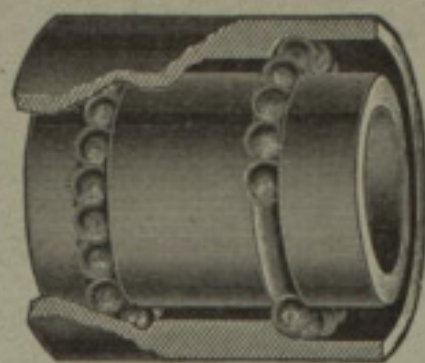
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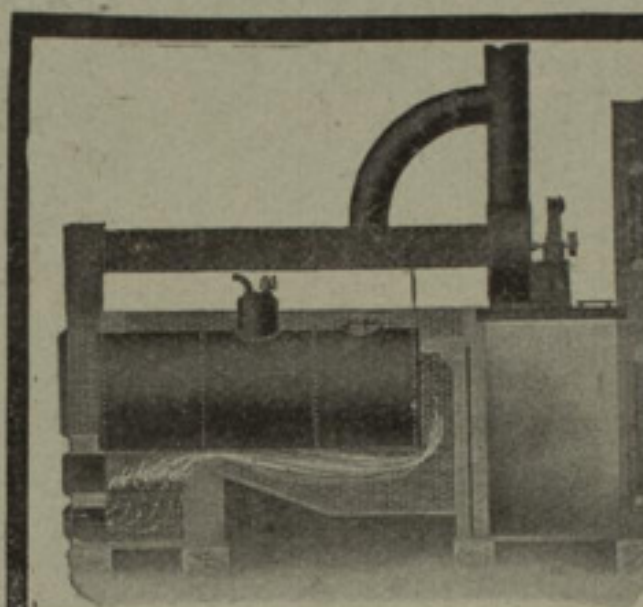
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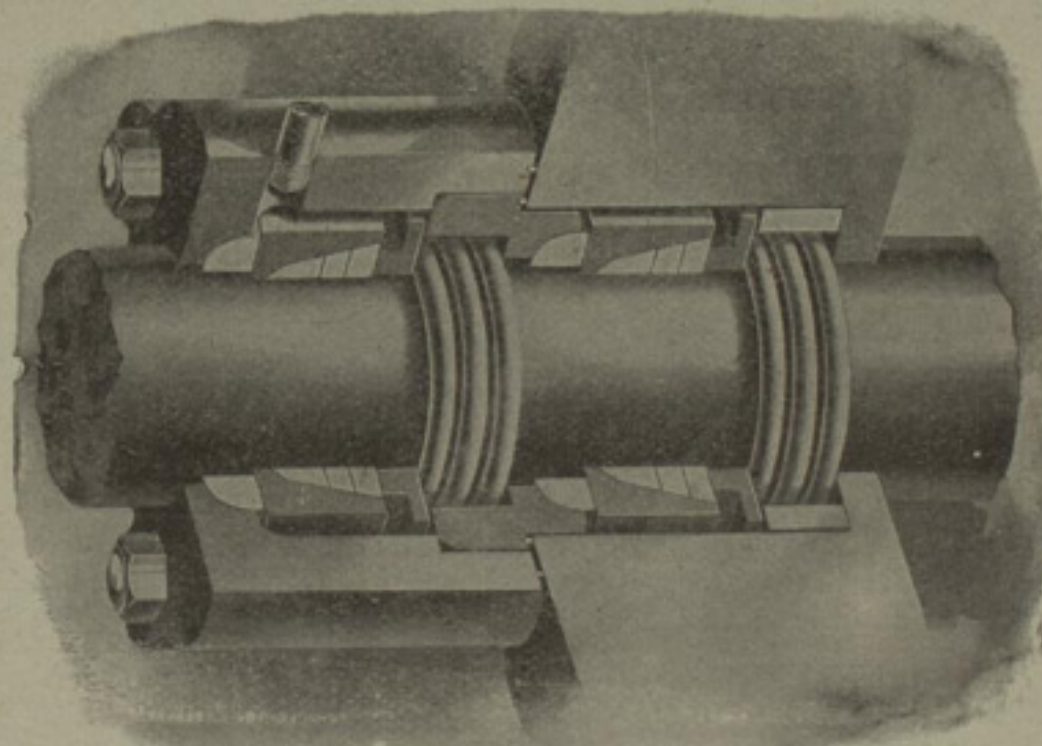
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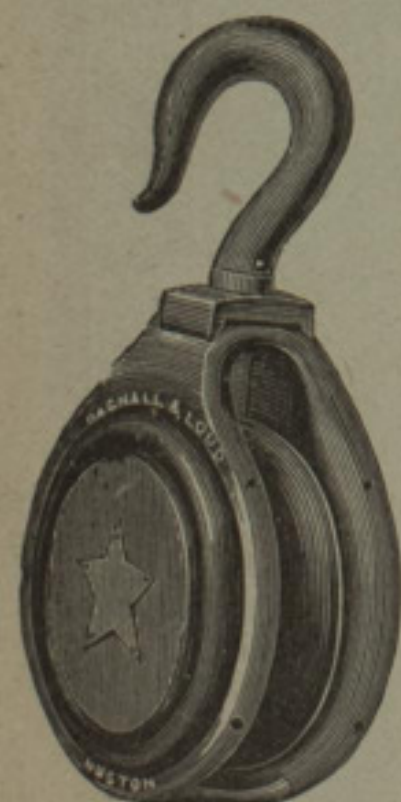
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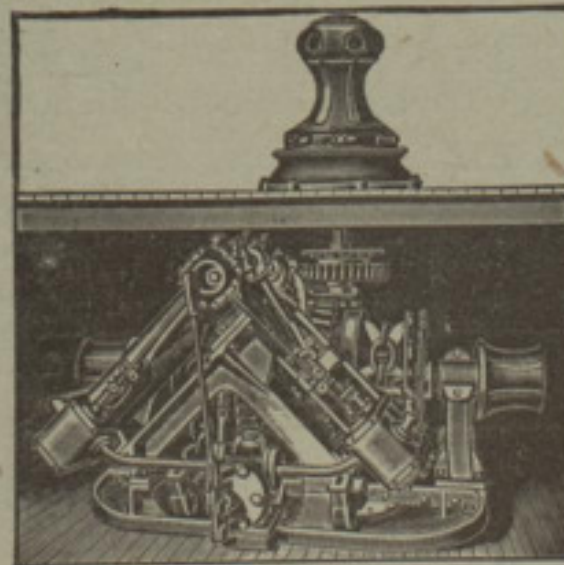
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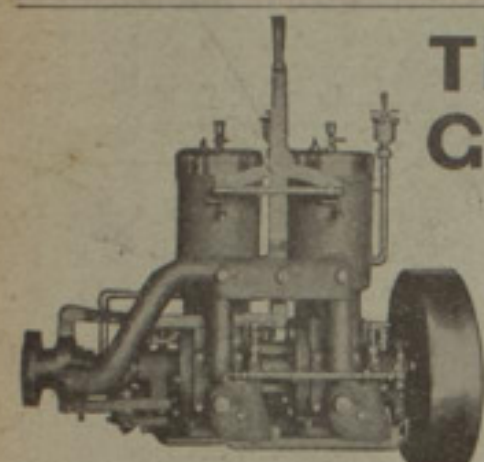


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VOL. XXIV.

CLEVELAND, O., OCTOBER 31, 1901.

No. 18.



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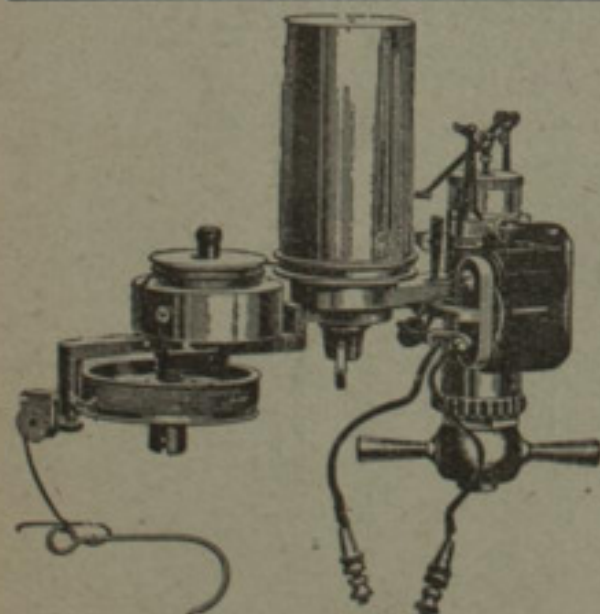
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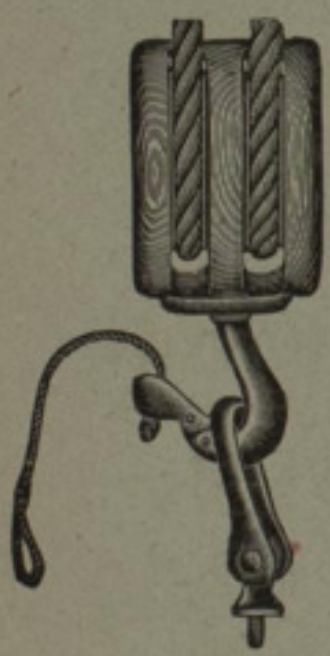
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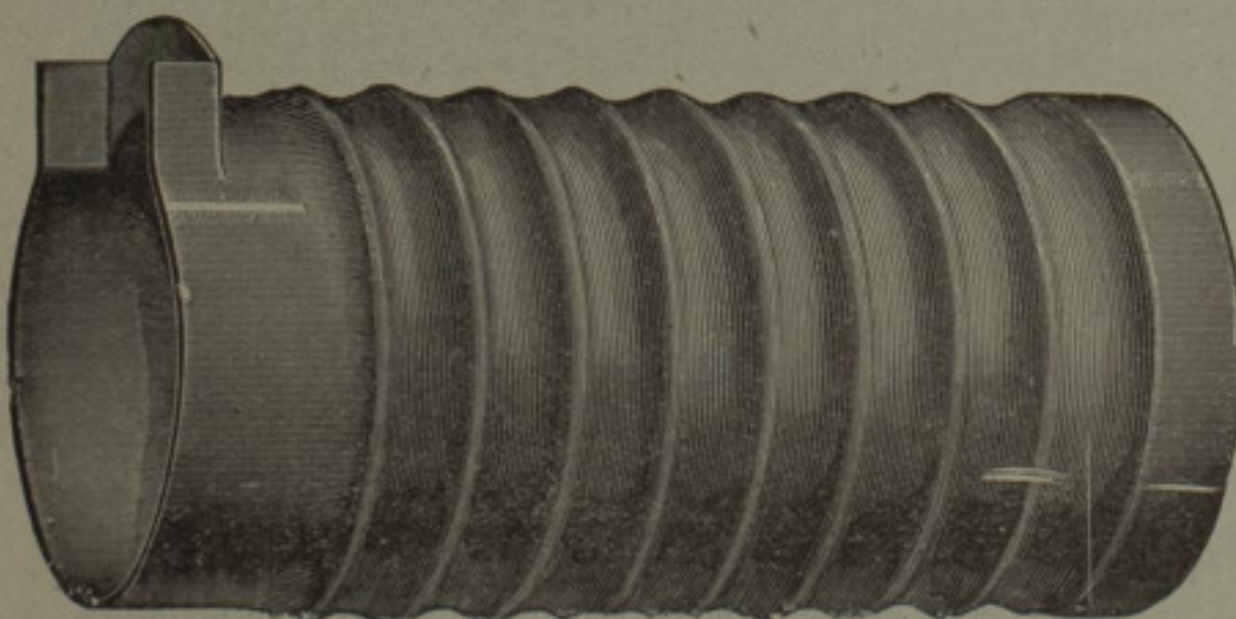
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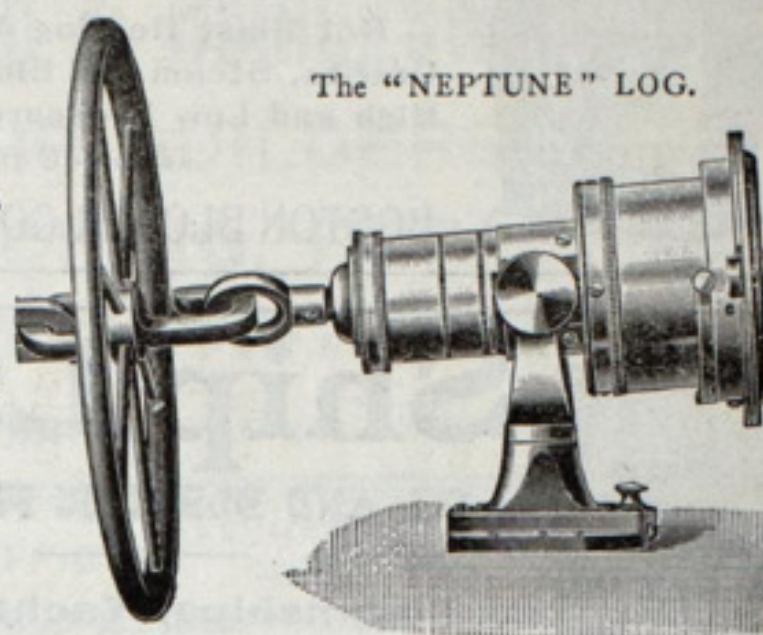
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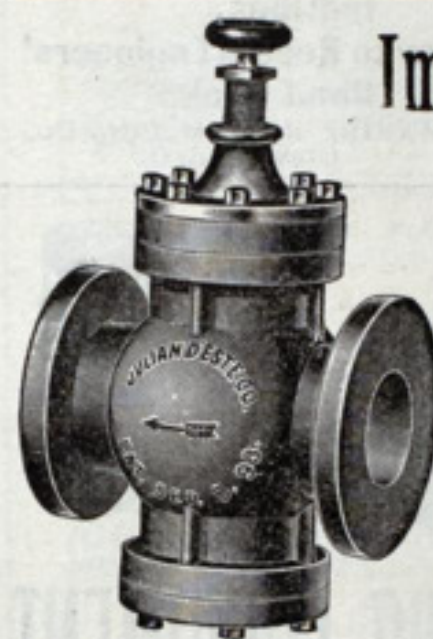
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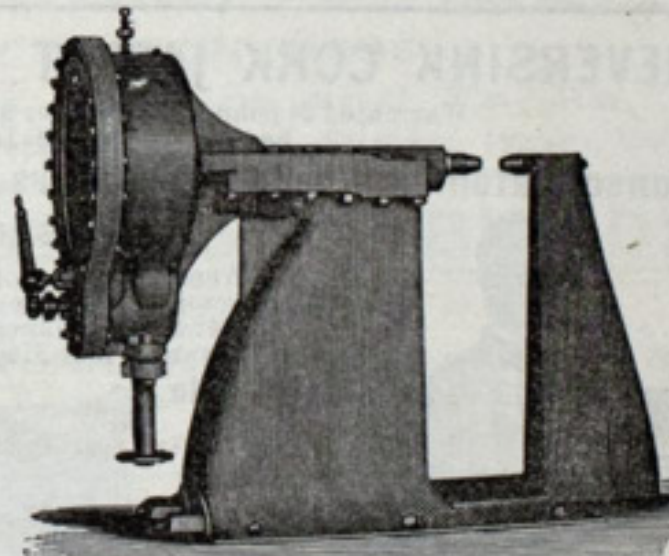
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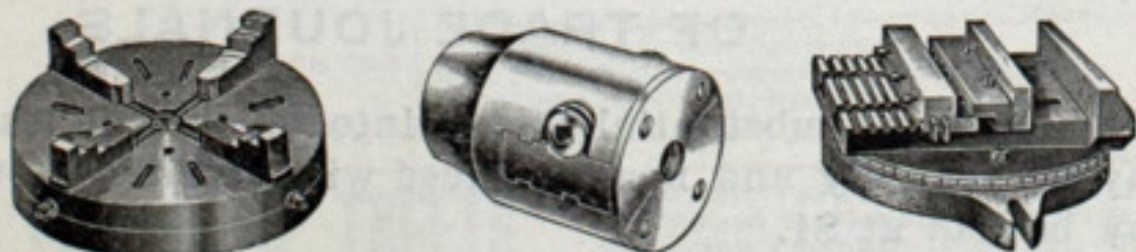


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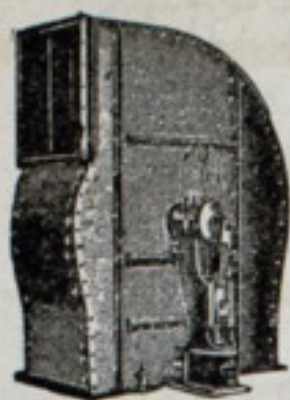
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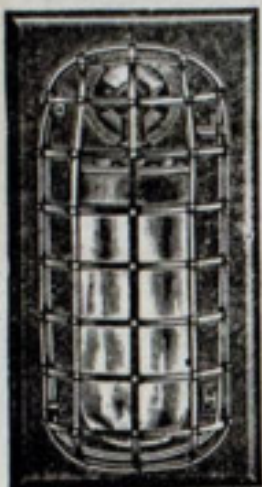
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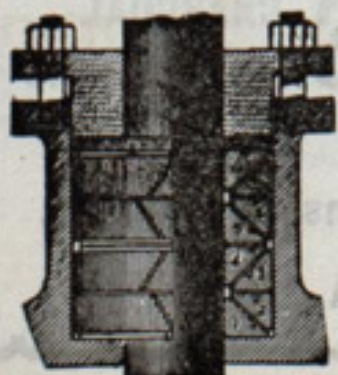
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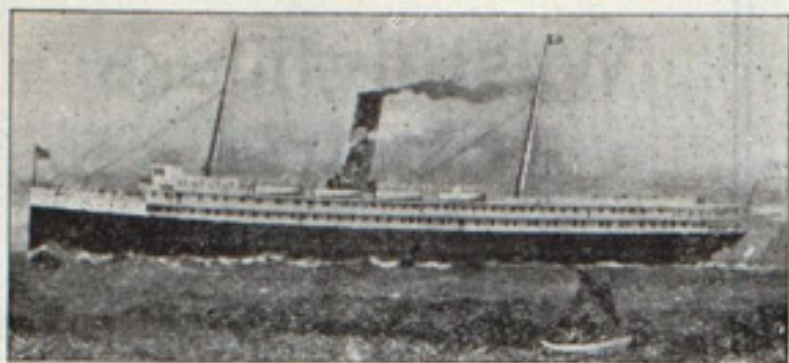
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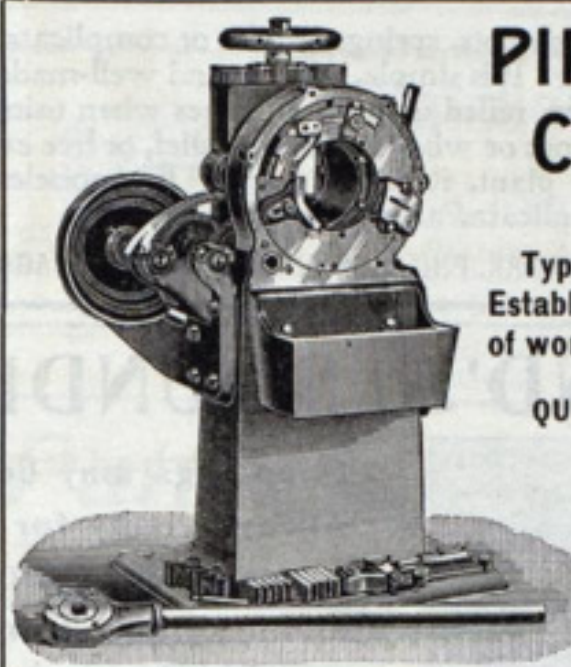
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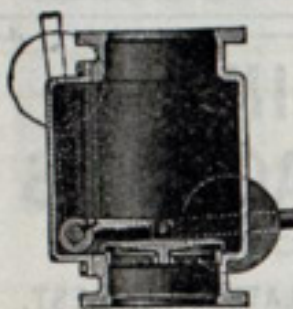
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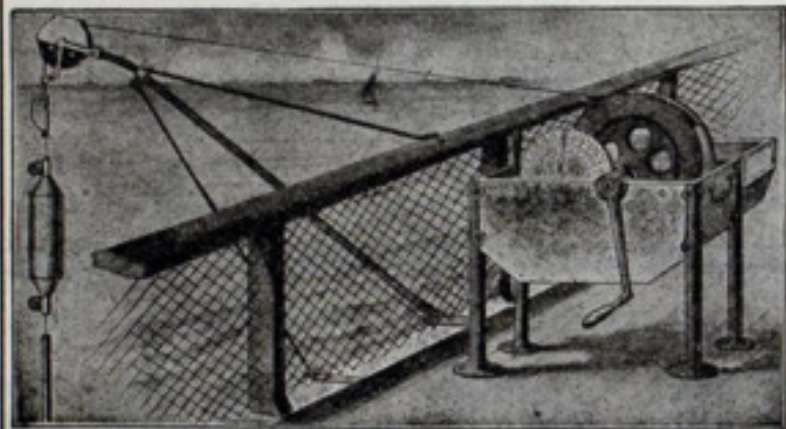
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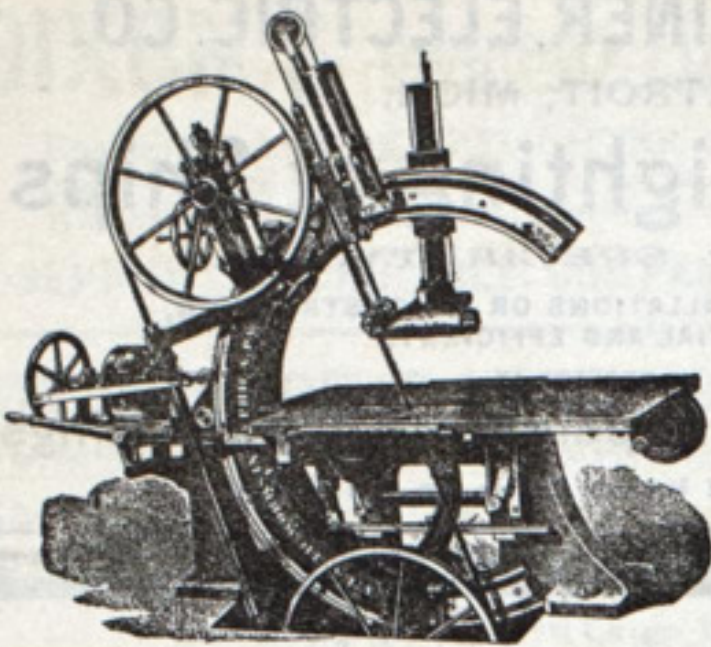
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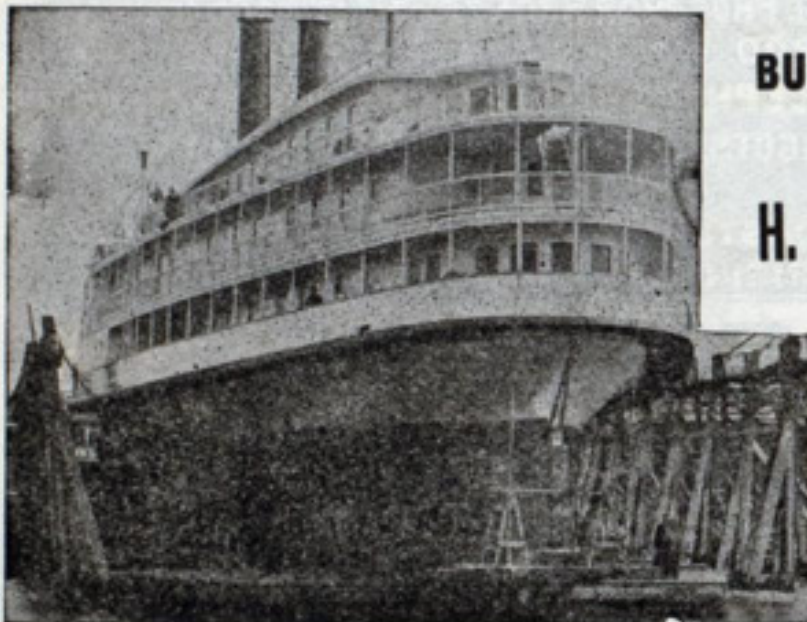
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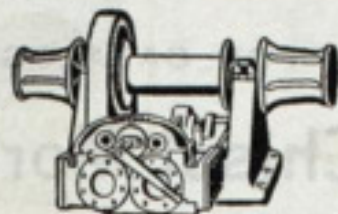
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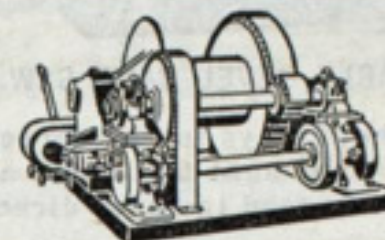
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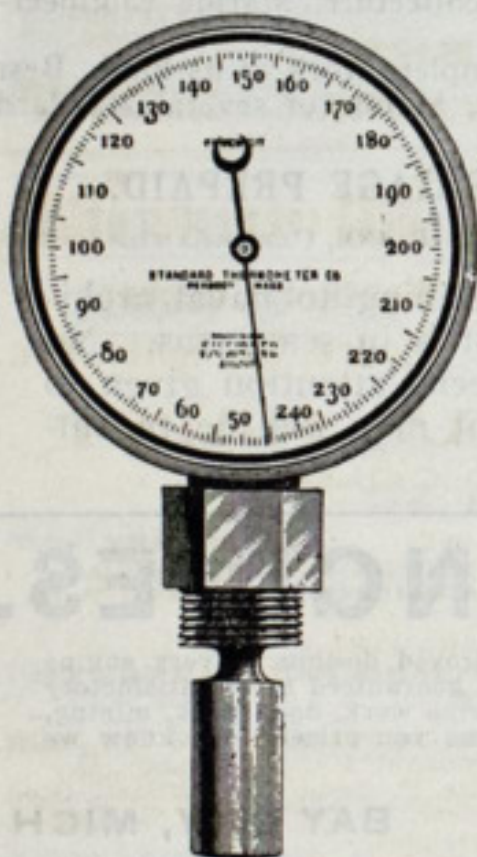
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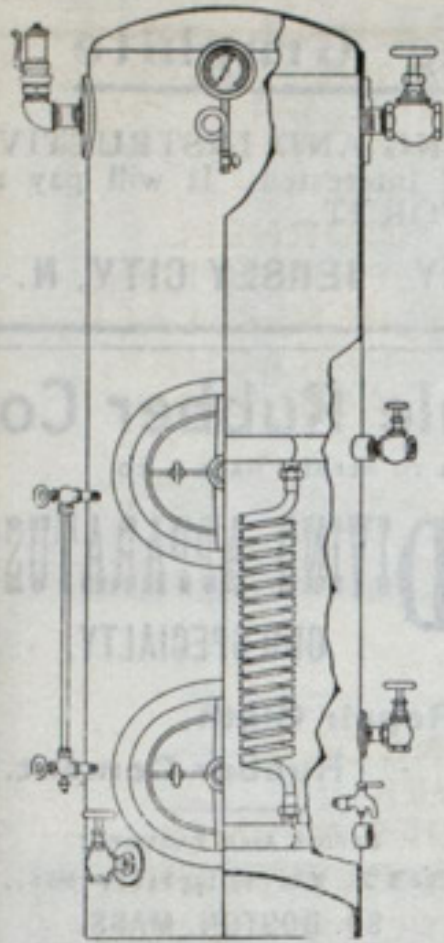
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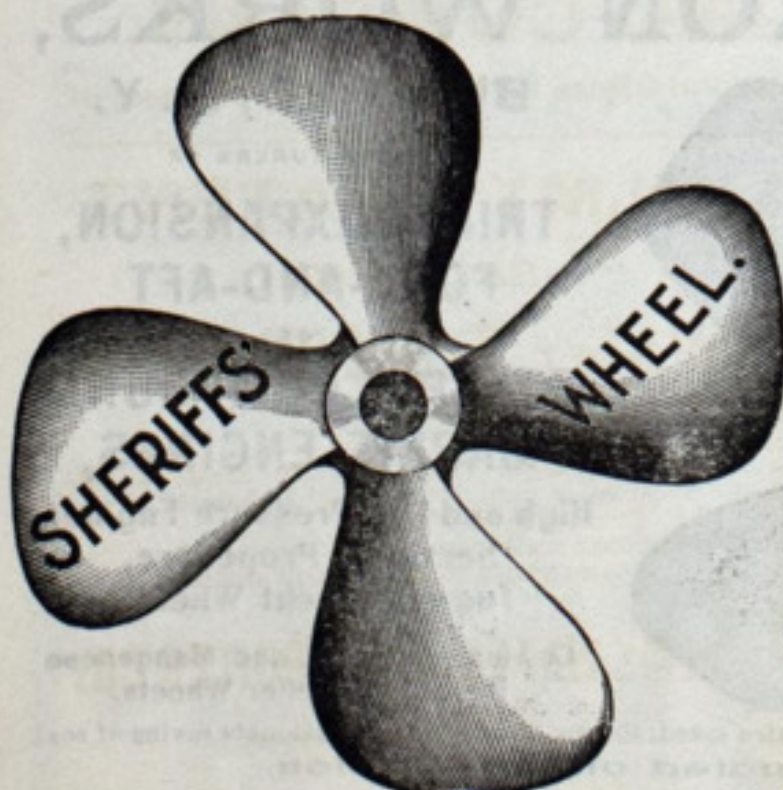
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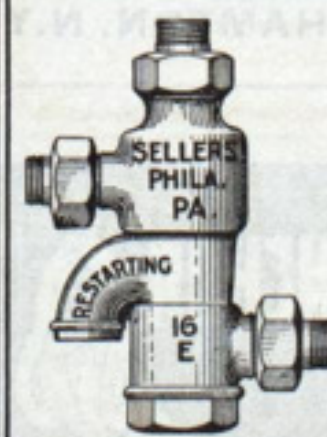
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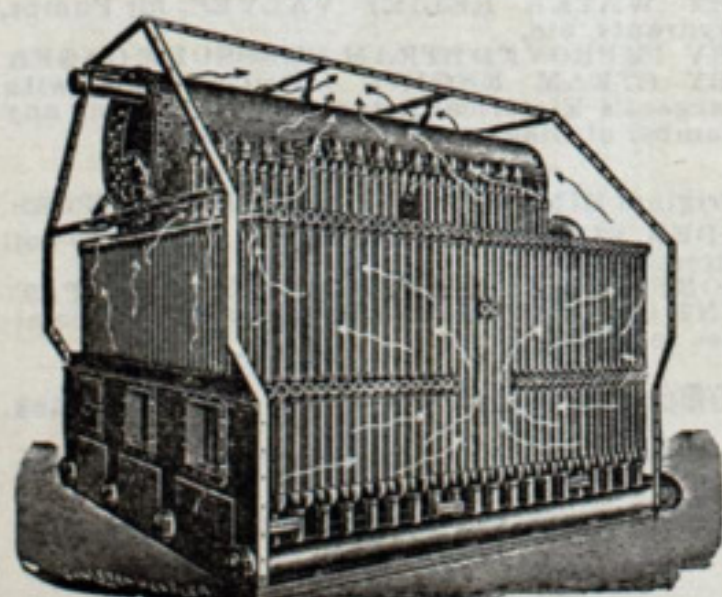
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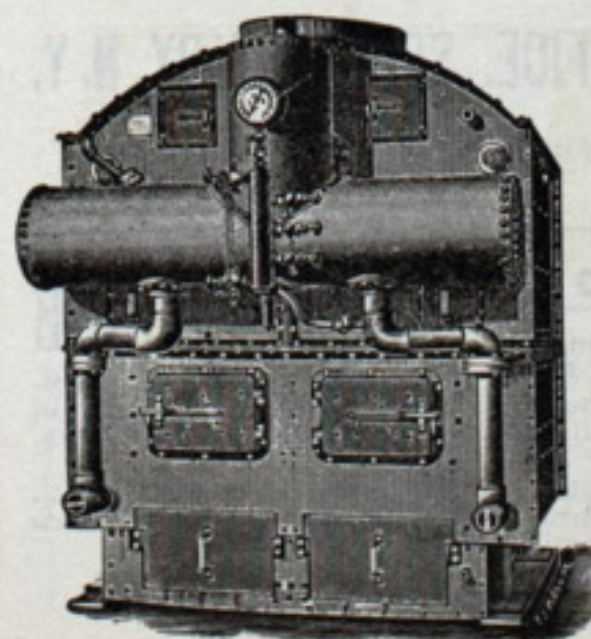
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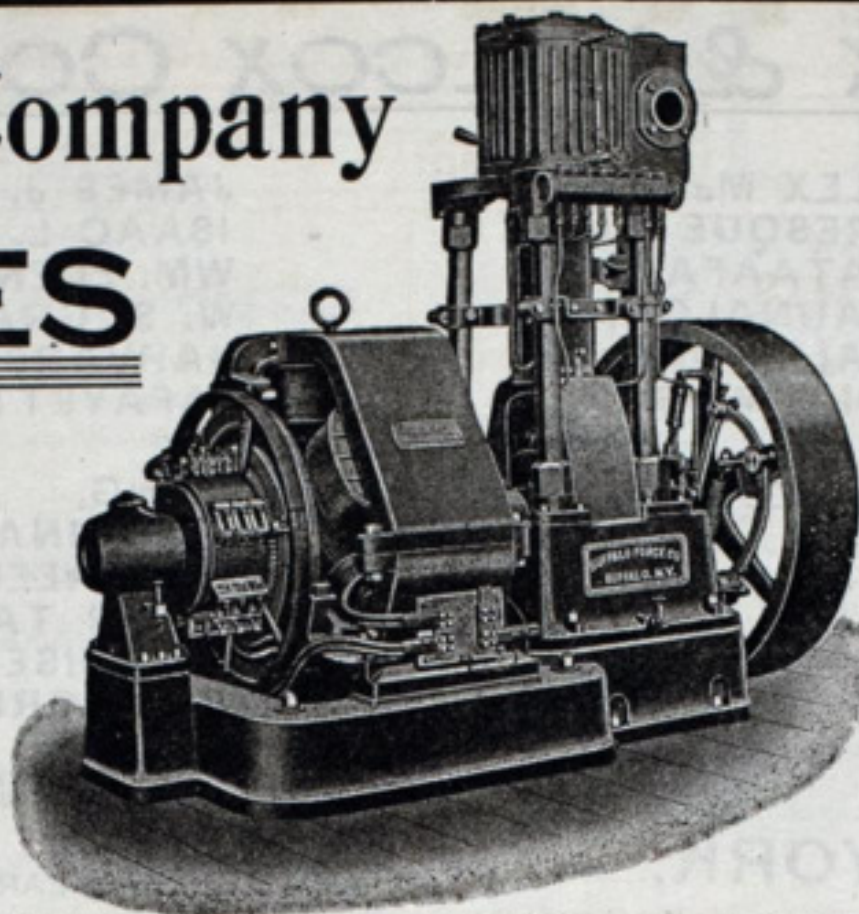
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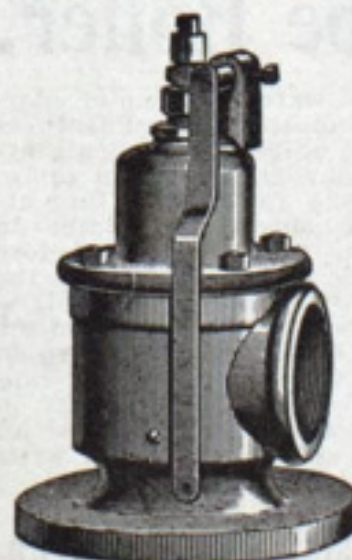
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